

# THE IRON AGE

JUNE 4, 1936

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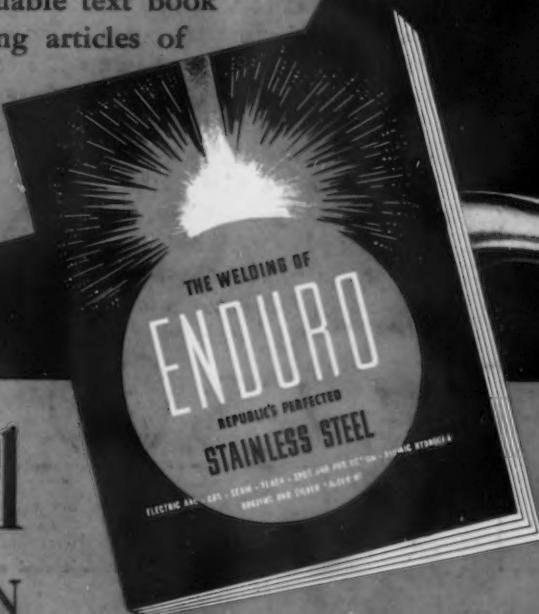
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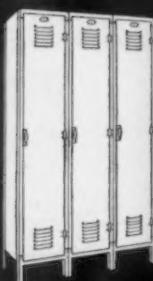


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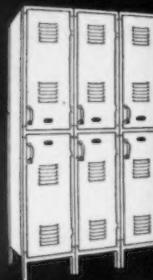
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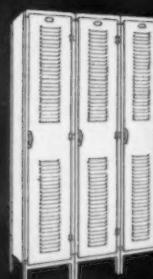
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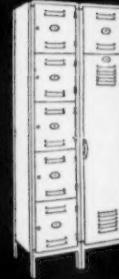
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**BERLOY**



# THE IRON AGE

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# ... THE IRON AGE ...

JUNE 4, 1936

ESTABLISHED 1855

Vol. 136, No. 23

## To Sharpen an Axe, You Need a Grindstone

ONE of the natural penalties coming from our editorial criticism of the New Deal is the occasional receipt of critical letters. One that came to us recently read as follows:

*"Why spoil a good trade journal with editorials from a deluded mind that evidently functions neither in good or bad weather? We want a trade journal and are not interested in G.O.P. junk and if you persist in writing this kind of stuff, please cancel our subscription."*

Mr. G., who wrote the letter, has been patient under long provocation, for we have been bearing down heavily, week in and week out, for the past three years on what we consider to be serious defects in the alterations to our economic machine being made in Washington. We have done this in the firm conviction that a trade journal in these days cannot fulfill its duty to its readers unless it deals boldly with the economic proposals that affect their interests. And we intend to continue doing just this until the people decide to accept or to reject the new economic blue-prints.

Judging from our reader reaction and almost continuous increase in circulation, the majority of those who receive The Iron Age appreciate our editorial sincerity. To those who do not agree with us, may we point out that criticism is a useful function especially when considering changes of great import.

The "Devil's Advocate" is both a time honored and useful office which prevents the canonization of the unworthy. We know that Mr. G., like any wise executive, would approach a new invention with caution, no matter how promising the blue-prints. He would summon his best advisers and say to them, "Poke all of the holes you can in this proposed device before I risk my money in it."

If it is the part of wisdom to subject a simple mechanical device to the severest possible criticism, is it not far more necessary to search for possible flaws in that which will affect the future of whole industries and the living of all of our people?

*J. A. Vauquel*

# Steel Industry Is Revitalized

THE steel industry took time off last week to regard itself with a bit of pride. It is proud of the achievements of the past year. It is also proud of the future it is cutting out for itself. The long depression years finally seem to be drawing to a close and the industry is being revitalized.

Not since 1930 had the American Iron and Steel Institute been in session while steel production had been above 60 per cent. Not since the steel industry was born in the United States had the major problems which every great industry encounters been faced with such a constructive program. It is no wonder that the 2000 steel men who sat down to a banquet at the Waldorf-Astoria in New York Thursday evening were inclined to rejoice over a job well done. It was this feeling which made the forty-fifth general meeting of the Institute one of the best in its history.

Eugene G. Grace, president of the Institute and of the Bethlehem Steel Corp., presided at the dinner meeting. Hugh Morrow, president, Sloss-Sheffield Steel & Iron Co., Birmingham, discussed the Constitution. He believes in it and so do the members of the Institute. As Mr. Morrow pointed out, the facts he presented served to sharpen old knowledge.

Myron C. Taylor, chairman, United States Steel Corp., faced the future with optimism. As the head of the world's largest producer of steel, he spoke with authority on the problems which confront the industry today. And Mr. Taylor feels that they are being solved.

Charles M. Schwab, the grand old man of the industry, arrived from Europe just in time for the meeting. He was introduced to his hundreds of friends amid thunderous applause.

Dr. Neil Carothers, of the school of business administration of Lehigh University, discussed the New Deal. He doesn't like it. His address was a great success. The steel industry seems to share some of his opinions.

At the morning session, the industry's leaders discussed the principal problems of the steel business. Their addresses are printed here in abstracted form. The technical papers in the afternoon were of unusually high caliber. They appear elsewhere in this issue.

## Industry and the Public

By Eugene G. Grace

WE are fully aware that to attain an orderly process of recovery our economic structure must be revitalized. It is not so much a question of what should be done. The chief question is how and by whom corrective measures shall be applied.

Shall freedom of initiative and

freedom of enterprise survive, or shall our social and economic existence be dictated and controlled by Government? This is the momentous issue confronting us.

I would be the last one to suggest that there should not be a proper relationship between Government and industry. Industry



MYRON C. TAYLOR

has not thought of asking to be left alone to do as it pleases without regard to the rights of others and the public interest. The danger in the present situation is that regulation has gone too far.

Businessmen do not claim that under our system of free enterprise we have attained the ultimate in the abundant life, but we do claim that industry has conscientiously cooperated in, and in a large measure has been the means of advancing our standards of living beyond those of any other nation on earth. Our obligation now is to make sure that this trend is neither reversed nor halted.

The thing that confuses the average businessman about this unemployment situation is what he sees every day. In many communities where practically normal numbers are employed in private enterprises and where the private charitable organizations are doing their regular job in caring for those in actual need, there are still vast sums of relief money being dispensed by the Government.

As a matter of fact, as the volume of business and employment has increased, relief expenditures have run a race to outstrip them.

In some quarters it seems to be a favorite pastime to shift the blame for continued unemployment to the shoulders of industry. The fact is that there are proportionately fewer unemployed in the manufacturing industries than in



HUGH MORROW

many other lines. In the steel industry, which is typical, the 450,000 people employed today are as many as were employed at the height of prosperity in 1929. Of course, some of these employees are not working full time, but they are self-sustaining citizens of their respective communities.

Given the same opportunities supported by a stable and economical Government in the form provided by our forefathers, there is no reason why this trend should not continue. The people by their own efforts and industry will seek and obtain still higher standards of living. This as in the past will create new industries and widen present markets, resulting in increased employment.

Our own industry is an example of the benefits flowing from technological progress. Not only have we improved quality and stimulated new uses for steel through research and technology, but also through large investments and engineering prowess there have been vast improvements in processes and equipment resulting in increased as well as more efficient production.

Here I believe the steel industry has performed a real public service. The results of these achievements have been passed on to the consuming public and to labor. We hope the time will come when our stockholders may also receive a larger share of these benefits.

Mounting taxes serve to dry up

markets. Taxes must be added to costs and they decrease the purchasing power of the buyer. Taxes on business, no matter how they may be disguised, in the last analysis must be borne by consumers. They are necessarily a charge upon production and must be reflected in selling prices.

The great body of consumers in the United States is made up of wage earners. Consumers as individuals are, in the mass, farmers, employees, stockholders, their families and dependents, so that taxation hits everyone's pocketbook. Workers, therefore, have a direct concern and a great responsibility to see that the structure whereby they make their livelihood is not undermined by excessive taxes.

Wage levels of employees largely determine their purchasing power as consumers. Wages and profits and their significance to consumption cannot be discussed apart from the consideration of prices.

Any tax on industry, therefore, is a tax on the main body of consumers, or, in other words, the workers.

Excessive taxation not only adds to the cost of production, thereby tending to increase prices to consumers, but it jeopardizes the possibility of making reasonable profits which are essential to healthy and growing business.

#### Social Betterment Interrupted

American industry was well on the way to solving the problems of social betterment and stabilization when the depression intervened.

Had not industry raised the living and working standards of its workers far above the levels of those in any other country in the world?

Certainly this is true of the great mass of the employing concerns in the United States. True there were some who still observed sweat-shop policies, but they were decidedly in the minority and on the way out.

It is unfair to place the whole of legitimate business in a strait-jacket to reform a few recalcitrants. Whatever might be achieved by this method would be at too dear a price and the wreckage resulting to general business and to the vast majority of workers would be too great.

Industry through achievement has demonstrated its belief in social security. Even though legislation may be necessary in some instances to protect employees, there are cases where employees would not be as well provided for through legislation as they are now. Where



EUGENE G. GRACE

voluntary programs are providing benefits comparable to or in excess of those contemplated under legislation, they should be permitted to do the job. In these programs all funds jointly contributed and administered by employee and employer are fully productive and devoid of the evils of politics.

The present systems of social betterment have been carefully and gradually developed along healthy and sound lines through a cooperative endeavor on the part of employees and management. Working together on these problems has promoted confidence, understanding, loyalty and efficiency. Herein is their great strength as compared to an impersonal adherence to legislative regulation under bureaucratic control.

#### Opportunity Must Continue

The path of progress lies in keeping open the doors of opportunity, in protecting our institutions and affording them an opportunity to grow and prosper, under the system of free enterprise that has made ours the leading nation of the world.

We in the steel industry recognize our responsibilities. This is evidenced by our efforts and achievements during the trying days of the depression to guide our industry toward a sound and permanent basis of recovery. It is evidenced also by the research and effort which are going on to improve our products in many ways

for the better service of the consuming public.

We have a tremendous responsibility to conduct this great enterprise in a manner eminently and jointly fair to the workmen, to the investors and to the public. These responsibilities and obligations are fundamental to all industry.

In summation, let me briefly state, as I see them, a few of our paramount necessities if we are properly to discharge those responsibilities and obligations.

We need Governmental conditions encouraging free and competitive enterprise.

We need Governmental policies that will strengthen our belief in American initiative and achievement.

We must have relief from excessive costs of Government, in order that products may be made at minimum cost to the consuming public.

We must have guarantees of the right of opportunity of the Amer-

ican worker to employment without interference or coercion from any source.

We need a condition of confidence so that the investing public may feel assured of obtaining an adequate and reliable return upon their savings.

We need to have an effective and workable basis for social security and to restore relief to a sound basis of local administration.

We must be allowed to have unhampered efficiency in production so that industry may pay wages leading to an improved standard of living, and so that lower costs to the public may provide an increased purchasing power for everyone.

Above all, our people, whether they be laborers or capitalists, must be made to feel that spirit of confidence in themselves, in the institutions of the country and in their national life, which will permit them to forge onward to still higher standards of accomplishment and living.



W. A. IRVIN

## Competition From Imports of Foreign Steel Products

By W. A. Irvin

OUR raw steel capacity is roughly 70,000,000 tons annually, raw steel capacity outside the United States is roughly 73,500,000 tons annually, thus we have about 49 per cent of the total capacity of the world and all other countries have 51 per cent.

In 1935 our own markets consumed steel products originating from about 34,000,000 tons of raw steel, and similarly outside markets consumed about 62,000,000 tons. Thus our home market consumed about 35 per cent of the world's output and the markets outside of the United States represented about 65 per cent.

Hence with 49 per cent of the world's capacity, we had at home in 1935 but 35 per cent of the world's consumption. On this basis alone we are justified in seeking to preserve, as far as possible, our own markets for our own mills and workers. A recent estimate of the American Iron and Steel Institute shows that during the past five years we have averaged only 34 per cent of the world's production, which is the lowest since the five-year period ending 1897. In 1919 we produced 60 per cent and in 1929—48 per cent.

The steel exports of the other chief steel producing countries are, of course, a much greater proportion of their production than is the case in the United States where less than four per cent of our production is currently exported in the form of steel mill products. From Germany, France and the United Kingdom, the percentage of exports ranged from 30 per cent to 40 per cent, whereas from Belgium and Luxemburg it is much higher, probably 75 per cent of their total production.

But we are not concerned with the percentages nor the amount of the exports of these chief producing countries, but the amount they export into our domestic market to the detriment of our own operations and interfering with the ability of our employees to secure additional employment.

Let us compare our direct exports to the leading steel producing countries and our direct imports from them. The figures will be those for the year 1935.

(1) The United Kingdom took about 11,500 gross tons of steel products from the United States and we imported from the United Kingdom 18,000 tons.

(2) France and the Saar shipped 14,000 tons to us and we shipped them an insignificant quantity of 1800 tons.

(3) Germany shipped to us last year 85,000 tons. In return we shipped to them 400 tons.

(4) Belgium and Luxemburg in 1934 shipped here 52,000 tons and this figure rose to 86,000 tons in 1935. We shipped to that country 2000 tons in 1934 and last year only 1500 tons.

It has recently been reported that Japanese steel makers have joined the ranks of exporters and are directing their attention to our Pacific Coast markets, offering there a wide range of common steel products. Steel importations from Japan have been negligible up to the present time. Our Government has recently found it necessary to increase the duties on cotton textiles because American mills are unable to compete with the cheap Japanese material. The United States Tariff Commission reports about 85 per cent of the operatives in the entire Japanese cotton textile industry are females mostly between 14 and 18 years old.

Our total importations of iron and steel products in 1934 were 272,36 tons, of which 115,470 tons was pig iron. In 1935, importa-

tions rose to 405,221 tons, of which 130,937 tons was pig iron. This is an increase in one year of some 50 per cent, a figure sufficiently important to be alarming. In the first three months of the present year the increase over the first quarter of 1935 is 245 per cent on pig iron and 58 per cent on rolled and finished steel products, which indicates that the growth of this movement still continues. The most significant increases seem to be in pig iron, nails and wire products, structural shapes, bars and pipe.

What are we going to do to combat this situation? Unless there is a marked change in the general industrial activity in Europe, the amount of steel shipped into this country promises to continue to increase rather than to decrease.

Our immigration laws wisely prevent the influx of cheap foreign labor as a protection to the American workman, but when steel is produced abroad with cheap foreign labor and is shipped into our market at low prices, depriving our mills of an equivalent tonnage and transferring the labor to foreign countries instead of having the work performed here, it is looked upon by some economists as a boon to American industry. But we, in the steel industry, who have felt this cheap competition, and the steel worker who has been deprived of employment, feel differently.

In the production of one ton of American barbed wire \$41.50 is paid to the American steel worker, while in Germany he receives \$16.10 and in Belgium only \$10.50. The Government, however, does not view these importations in the same light as we do, because barb wire is on the free list and no action has been taken to prevent such importations under our Anti-dumping law. Barbed wire is only one of the products included in the 230,000 gross tons imported in 1934 and the 348,894 gross tons in 1935. During the latter year these importations represented 11,750,000 man-hours—enough to give 10,000 American steel workers employment for six months.

What constitutes injury to a home industry? Must importations attain such magnitude that industry is forced to close down? The decisions under this act seem to imply that when you can no longer operate, when your mills are idle, when you are unable to give employment to thousands of American workmen, then and then only can this law be enforced. This is a sharp contrast with the prompt and effective action taken by Can-

ada in such matters, and recently by the Government of South Africa in shutting out American imports of galvanized sheets by a prohibitive dumping duty. The dumping laws of these countries are framed to protect their industries against the importation of any quantity imported, large or small. Ship only one ton of steel into these countries and if the price be too low dumping duty will apply although that ton was the only lot involved.

The steel and other American industries should give these matters greater consideration. Our present Anti-dumping Law should be supplanted by one which is effective and which can be put into force as soon as dumping occurs. Our tariff rates should be high enough to protect American industry and labor against the cheap costs and pauper labor rates of foreign countries.

In the meantime, our only hope seems to lie in convincing purchasing agencies of the Government whether Federal, State or municipal, and private buyers generally, that their best interests are served by placing their steel orders at home not only for the benefit of American industry and labor but to the end of preserving the high standards of living which we enjoy and are trying to maintain in this country. If these importations of foreign goods are encouraged and allowed to expand indefinitely there can be but one answer, one defense: namely, a lowering of our costs of production here to meet that challenge which



T. M. GIRDLER

immediately leads to a lowering of our standard of living to a level somewhere nearer to that level of wages with which we are compelled to compete.

## Problems Confronting the Industry

By T. M. Girdler

THE basic problem facing the steel industry, just as it faces every other business, is one of operating at a profit. All the other questions with which we deal every day lead back to this one all-important problem. Upon its solution depends the life of our business, a fair wage for our employees, a reasonable return for our stockholders, and the reserves necessary to keep up our plants and for emergencies.

The profit record of the steel industry, even in good years, has been most unsatisfactory. Over the past 10 years the average annual return on investment in the industry has been only little more than 3 per cent.

I believe the time has arrived when those of us charged with the responsibilities of management in

this industry must face the realities of the problem of profits. We must take a fresh look at all the factors involved, and apply ourselves to the job of making a profitable industry out of the steel business. We owe this to our employees and to our stockholders.

The problem of profits in the steel industry is complicated by the factor of costs, which for many special reasons are high. Not only is a large initial investment required for a steel plant, but obsolescence is most rapid in the industry. Last year the industry spent \$140,000,000 in plant improvement and this year it is expending \$200,000,000. Moreover the steel industry to a degree unknown in many other industries must sink large sums of capital in raw material reserves, and heavy

amounts must be charged off each year for depletion.

Furthermore, the nature of present-day consumer demand is such that it is impossible for the steel industry, in spite of its enormous investment in plant and equipment, to reap the same degree of benefit from such equipment as is possible with industries such as the automobile industry, where complete development of mass production is possible with its resultant economies. An automobile plant may concentrate its entire production facilities upon turning out vast numbers of a single model; but the steel industry must stand ready today to turn out literally thousands of models of its product.

Today every user wants steel made especially for his particular requirements and according to his particular specifications, with the result that we must be prepared to make steel to many thousands of specifications. Once it was possible to schedule a mill for weeks or even longer for uninterrupted rolling of a standard product in general demand. But that day is gone. The ability of the industry to meet this changed situation does credit to its engineering ingenuity, but that it has added enormously to costs no one can deny.

Thus there are practical limits to what can be accomplished along lines of reduction of costs—and we must therefore rely upon volume as the source of profits. This has always been true of the steel industry, and it is even more true today. The great question now before the industry is how to maintain and increase its volume.

#### Low Prices Necessary

I strongly believe in the principle of low prices under our modern system of mass production and consumption. Prices for steel ought to be as low and as cheap as possible in order to encourage the widest possible use. That is sound business. It is only proper that the industry should pass on a share of savings from improved methods and increased efficiency to the customer in lower prices. But that is not to say prices should be below costs, or so low that a reasonable profit is impossible. That is business suicide and a betrayal of our stockholders. The problem is one of increasing volume on a basis which will yield satisfactory profits.

Many steel markets are reviving and new ones are developing—but how soon a broad and enduring market for steel will materialize will depend upon the factors influencing long-term investments. In spite of the many uses of steel in

the consumer goods industries, these industries alone are not strong enough to develop the breadth of market needed by the industry. Durable goods activities, such as re-equipment and rehabilitation, railroad repair, pipe lines, and building, both industrial and residential, are necessary properly to round out future markets.

The threat of additional and unsound taxation is typical of the factors originating in Washington which continue to retard long-term projects. The steel industry affords an excellent example of the heavy burden which taxes have already imposed upon business. In 1935 taxes paid by the steel industry were nearly \$10,000,000 greater than in 1934. The industry paid the equivalent of \$3.30 for each ton of finished steel produced in taxes to local and Federal governments, while its earnings amounted to only \$2.30 a ton. The tax bill was equal to over five weeks' average pay for each of the industry's employees. It amounted to \$133 for every employee and \$132 for every stockholder.

When taxes reach this proportion, and under the new revenue bill and the social insurance tax they will be much higher, they become a charge of major concern to every person attached to the industry. It is one of the responsibilities of management to call the attention of both employees and stockholders to the excessive tax burdens imposed upon business by tax-spending authorities. How acute the tax situation has become in the steel industry is summed up in the simple fact that for every 50c. going to a stockholder in dividends last year, \$1 went to tax spenders and wasters.

#### Market Unlimited

In my opinion there is literally no limit to the potential markets for steel in this country. The need

for developing these markets to their fullest extent is made all the more evident by the large increase in strip and sheet capacity that has been under way in recent years. For one thing I believe we are going to see a great increase in the use of steel in the building of homes, by means of steel frames and other forms of construction, once the building industry gets under way. Modern alloy steels are finding new applications every day.

#### Must Educate Public

It is our job to bring to the average man on the street and to the woman in the home a better understanding of what the steel industry is and the important part it plays in their lives. It is one of the great changes that has taken place in the industry that steel is no longer used exclusively by a few great consumers like the railroads and heavy construction. Steel now is fabricated into thousands of articles in every day use by everyone. It may be said that although there are in this country only a few thousands of first-hand buyers of steel, it is used by the entire population of 127,000,000 people in the form of automobiles, refrigerators, and innumerable products.

These people, whose daily lives are made more comfortable and convenient because of steel, constitute our ultimate market. Certainly we want them to have a better understanding of what the steel industry is and what it does. We want them to realize that this industry which serves them is an aggregation of individuals composed of 450,000 employees and 500,000 stockholders. Then the public will know that when politicians attack the industry, that attack is in fact directed against the bread and butter and the savings of nearly a million families.

## A Sound Commercial Policy for Steel Makers

By E. T. Weir

COMMERCIAL activities represent the culminating point of any business—the point at which it transfers its product into other hands for immediate use or for further processing. A commercial policy may be construed as including only matters immediately bearing upon this transaction, or may be thought of as embracing many other phases of business that indirectly affect the transactions or are affected by it.

I prefer to think of it in the second way, because I do not consider

the selling of a product an isolated action. I believe it to be the middle link in a continuous chain of circumstances that begins where the product begins to be made and leads all the way through the plant of the producer into that of the customer—even beyond, to the ultimate consumer. A commercial policy, of course, involves every relationship between seller and buyer. In addition, it affects the relationship of a producer to his own business and his own people, to the other members of his industry and



ERNEST T. WEIR

to the general public. Therefore, I believe that for the commercial policy of a steel maker to be sound, its effect must be constructive in every direction in which its influence extends.

Since under any commercial policy everything must lead to or away from an actual sale, the best starting point is probably the relationship between the seller and the buyer. While not necessarily opposed, the interests of the seller and buyer are different. In this circumstance we have the reason why it is essential for the producer to establish a general policy that will guide him in making specific commercial decisions which will protect his own interest, and at the same time will be fair to everyone else concerned. In the sale of his product the producer endeavors to recover all of his costs, plus a reasonable profit. In the purchase of a product, particularly where it is intended for further processing and resale, the purchaser endeavors to secure the commodity which most adequately fills his needs, at the lowest price and therefore at the greatest profit to himself.

A sound commercial policy is one which is shaped so that every transaction that occurs under it brings an adequate return to the producer and at the same time gives the consumer the product he

wants, when and where he wants it, in the form that permits the greatest efficiency in use, and at the lowest consistent price. In addition, every such transaction must be in the interest of society. As a matter of fact, any private transaction that is against public interest in the long run injures one or all of the parties directly concerned.

#### Value of Product

A sound commercial policy for steel makers must be an inviolable rule that every transaction shall yield the value of the product to the producer—the value to consist of all prevailing costs plus a reasonable profit.

However, while producers should resist every outside pressure and every temptation of their own to lower prices below economic levels, another fundamental part of their commercial policy must be a determination constantly to lower the prices at which they can economically sell their product. This type of price reduction, which is made possible only through lowering of unit costs of production, has as a virtue the opposite of every vice in the other method. The pressure from customers for lower economic prices should be welcomed by producers as a spur to their initiative and efficiency. Producers and their customers should join whole-heartedly in a continuous effort to reduce costs and prices all along the line, to the end that a better and cheaper finished product may be offered to the ultimate consumer.

Producers may follow two main avenues to lower unit costs and prices. They may increase volume, which within easily determinable limits lowers unit costs. Greater volume of steel production must be found, as it has been in the past, in completely new developments, such as air conditioning; in the development of steel as a superior product for applications in which other materials are now used, many examples of which will occur to you;

and in the extension of the present uses of steel, such as the comparatively recent merchandising of motor oil in cans. Steel makers should conduct laboratory research in their own plants, and should cooperate in practical studies of the use of steel in the plants of their customers, to the end that the consumption of steel be expanded.

#### Improved Operating Methods

The second great avenue for the economic lowering of unit prices is in the improvement of operating methods and the reduction of costs. All items of cost have possibility of reduction. One of the most important cost items in the process of manufacture is the cost of labor, which doubtless will continue to afford great opportunities for economies to the advantage of labor, the manufacturer, and the customer.

The effect upon labor of reduced per unit costs of labor is often misconstrued. This is probably due to a confusion of the costs of labor with the wages of labor. An economic reduction of per unit labor costs should never produce a reduction in wages. In fact, the direct contrary should be true. Reduction in the cost of labor per unit is essentially a reduction in the amount of time expended in labor on each unit of work with a consequent greater output and greater return in which labor not only has the right to share, but must share if economic principles are to be observed.

The sound manner of reducing labor costs is to implement the worker with improved machinery and to increase the efficiency of his working methods so that he is able in a given time to turn out a greater amount of material, or better material, or both. As a result, while a lower price may be received for each unit of his work, he turns out so many more units that the aggregate return for his work is much greater than it was under older methods.

## Labor Relations in the Steel Industry

By Charles R. Hook\*

THE first plank in the platform of satisfactory employee-employer relationship is a wage schedule which compensates the worker fairly and generously within the continuing ability of the employer to pay. It would be manifestly unfair to the worker to establish a wage schedule that would stop the

\*Read by H. A. Roemer, president, Sharon Steel Corp.

purchase of the goods, upon the sale of which his employment depends. A high hourly rate of pay and no hours of work will not buy food, clothing and shelter. The unemployment situation in the building industry is an example of high hourly rates and few hours of work.

The second plank contemplates  
(CONTINUED ON PAGE 48)



Courtesy of American Bridge Co.



SINCE the bulk of all electric furnace steel used today is melted in the basic Heroult type of furnace, this process is almost synonymous in the public mind with "electric furnace steel." One of the first things learned about this furnace was the fact that electric heat was no magic cure-all for the ills of steel making. The subject will be discussed more at length under "Interchangeable Steels", but it is necessary to say here that the basic arc furnace is the most versatile piece of steel melting equipment ever devised. Although it can make the purest, the cleanest, and the most uniform, high quality steel ever known, it can also make a most non-uniform and questionable product. A three-manual pipe organ may be a thing of beauty in the hands of a master, but its very complexity is the un-

doing of the tyro. So, in listing the virtues of electrically melted steel, it must be understood that while these are things which the process has demonstrated its ability to do on a production scale, *these things are not necessarily the inevitable consequence of melting steel in an electric furnace.*

Electric furnaces are unique in that there is no need for an oxidizing atmosphere to support fuel combustion. Since many of the useful elements in steel, such as carbon, manganese, silicon, chromium, etc., are readily oxidizable at steel melting temperatures, they obviously cannot be conserved in the bath under oxidizing furnace conditions. With the neutral or reducing conditions that can readily be produced and maintained in the electric furnace, many of these oxidizable elements can be held constant in the bath for long periods. Time is allowed to send samples to the control laboratory for exact analysis and then, by

"dead reckoning", alloy additions can be made in order to arrive at the chemistry desired.

It must not be inferred that all alloys can be added to an electric furnace as easily as salt may be dissolved in water, but it is certainly true that the electric melter is not called upon to catch his analysis "on the fly" in the sense that it must often be done in open hearth melting.

Another pertinent factor is the much smaller average size of electric furnaces compared to open hearth furnaces. Obviously, it is easier to maintain accurate and uniform chemistry in 5 or 10 tons of molten metal than in 50 or 100 tons.

The high-frequency induction furnace has still another advantage which may bear upon the subject of accurate analysis, especially in the very rich alloy steels. That advantage is the rapid stirring action set up in the bath by the induced currents.

\* Abstract of paper and comments presented before the American Iron and Steel Institute, May 28.

# Electric Furnaces and

## Their Part in

### Metallurgical Progress\*

By FRANK R. PALMER

*Assistant to the President,  
The Carpenter Steel Co., Reading, Pa.*

It would be desirable if this discussion could be concluded with a tabulated list showing just how close limits the electric furnace can work to. Unfortunately, this cannot be done—there are too many variables. For one thing, the desired percentage of individual elements, differs widely in different steels, and the analysis tolerance must take this into account. For example, the carbon specified in different steels may range from 0.05 to over 1 per cent, and a tolerance that would be practical at 0.05 per cent would be too narrow when aiming for 1.20 per cent. Chromium might be wanted as low as 0.25 or as high as 20.0 per cent; obviously the same tolerance could not apply to these extremes. The same difficulty is presented by many of the other elements.

The balance of alloys present often determines how close a particular element can be maintained. Consider metalloids like sulphur and selenium, both of which are being deliberately added to electric

furnace alloy steel for free machining properties. Aiming for 0.25 per cent selenium, it would be easy to stay within limits of 0.20 to 0.30 per cent if the manganese is less than 0.50 per cent. However, if an attempt is made to add these same metalloids to Hadfield's manganese steel, the loss of metalloid is so rapid as to be completely out of control.

Faced by a given chemical analysis, the steel maker can tell how close he can keep each element, and we must be content to say here that he can hold to definitely closer limits in electric steel than he can in the open hearth furnace. This applies, of course, to point blank shooting and not to "heat selection."

#### Lower Phosphorus and Sulphur

Phosphorus is removed under oxidizing conditions in a basic furnace, hence the electric arc furnace has no particular advantage over the open hearth furnace except that because it is customary

to employ lower phosphorus melting stock in the electric furnace, the final content is generally lower. Sulphur yields slightly to an oxidizing condition under a basic slag, but it can be substantially eliminated only under reducing atmospheric conditions. This was one of the earliest advantages pointed out for the electric arc furnace.

In double slag arc furnace practice, both the phosphorus and sulphur can be reduced to a point that out-distances even the justly famous Swedish ores. The most casual control in double slag practice should keep both elements under 0.03 per cent; more concentrated care will easily keep them under 0.02, and it is entirely possible with added time and cost to get both under 0.01. We have even seen melters given a limit of 0.005 maximum for sulphur and stay under it.

It should again be emphasized that the above figures are given simply to describe the capacity of the process. Phosphorus and sul-

phur limits cannot be practically arrived at without due consideration of the rest of the analysis.

The high-frequency induction furnace, like the crucible melting process, has no capacity to eliminate either phosphorus or sulphur. In this process the raw materials used determine the ultimate composition.

#### Cleaner Steel

By "clean", we refer to relative freedom from slag and other non-metallic impurities. Clean steel is not necessarily guaranteed by electric furnace melting, because the non-metallics that appear in "dirty" steel do not all originate in the furnace; a considerable part may come from ladle or spout refractories or result from dirty mold practice.

Insofar as clean steel is made inside the melting furnace, the degree of success depends upon deoxidation and the removal of sulphur, both of which can be accomplished by the electric furnace. If the steel is not properly deoxidized by the slag, some of the silicon will be converted to the oxide (silica) and the metals like iron, manganese, chromium, etc., will also be oxidized in a degree. The metallic oxide combines with the silica to form the glassy slags such as iron silicate, manganese silicate, chromium silicate, etc. As these are being continuously formed in an oxidized bath, they never get a chance to float out. Sulphur always exists in the final product as a metallic sulphide which is a slag-like inclusion. These sulphides are soluble in the molten steel and are precipitated only at the moment of solidifying in the mold; hence sulphides are always present in steel in direct proportion to the percentage of sulphur contained. The only way to get rid of sulphide slag is to get rid of the sulphur.

In making clean steel, the electric process depends upon its ability to work under a reducing atmosphere and a reducing slag. Not only do these deoxidize the metal and inhibit the formation of silicates, but they remove a large part of the sulphur and decrease the sulphides proportionately.

The smaller average size of electric furnaces is again a big help. It is easier to avoid slag contamination of the metal after tapping when handling a few tons of metal

than it is when handling a hundred tons or more.

#### Segregation

Steel is a crystalline material and must, therefore, freeze selectively as it solidifies in the ingot mold. This selective freezing gives rise to segregation, the degree of which may vary greatly depending upon many circumstances.

The question is, "In a given steel, is less segregation likely in the

electric furnace product? High phosphorus and sulphur, high oxide content, high pouring temperatures, large ingots, fast teeming and slow freezing promote segregation; their antipodes discourage it. What is the effect of electric furnace practice upon these variables?

The electric furnace is preferable in all these cases. It gives lower phosphorus, sulphur and oxides. The proper pouring tem-

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### Abstract of Comments by F. F. McIntosh, Metallurgist, Crucible Steel Co. of America

In line with the recognized duty of being critical, Mr. Palmer should be congratulated on the excellent presentation of the subject, and to admit general agreement with his thesis.

There are some points on which issue can be taken, at least to the extent of not being in full agreement with the author and without quibbling over terminology or facts. It is felt, for example, that the sequence of events used in presenting the concept of "interchangeable" steels has overlooked a most important stage in the history of the tool steel industry.

The impression is given that about 15 years ago a method of metallurgical testing was devised by McQuaid and Ehn, and that interchangeability in steels is the direct result of this metallurgical development.

Without in any way detracting from the importance, novelty and usefulness of the work of McQuaid and Ehn, the maker of fine tool steels can take well-founded exception to the chronological position and the inference of novelty which has been given to interchangeable steels.

The brand names of reliable tool steel manufacturers are guarantees of interchangeability, and, at the same time, give a convenient method of designating the kind of steel represented. A steel of well-established brand is the same steel in the full sense of interchangeability whether purchased in Boston or in San Francisco, or from its home mill. Brand names have been used for more than 15 years, and the use of this cumbersome word in a metallurgical sense is novel only so far as the use of the word itself is concerned.

Metallurgical interchangeability is defined as—"If the two shipments (of steel) are indistinguishable in their behavior in his shop, then these two lots of steel are interchangeable." The brand steel of a reputable tool steel maker complies fully with both of these definitions. It is made according to the mechanical definition and it is tested according to the metallurgical definition. The brand is the guarantee of composition and of quality in every sense of the word.

It is felt that novelty cannot be claimed for metallurgical interchangeability merely because new tests have been devised for assisting the laboratory in testing the product of the mill. New methods of testing have facilitated the work and have reduced the personal element of skill and judgment. The testing of brand steels by tool steel makers, however, developed with the industry and has long been such as to insure those uniform characteristics of property and performance which the tool steel maker guarantees when he uses a brand name.

In connection with the general statements which are made in the paper in regard to the coreless type of induction furnace and the arc furnace, and particularly as to mixing of the molten metal in the induction furnace and size of the arc furnace, it will be interesting to note the extent to which an element such as chromium can segregate in a quiet, well-killed bath of metal under reducing conditions.

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perature can be attained for each melt, small ingots are more economical for electric units than for larger furnaces, teeming, speeds are lower, and all these factors serve to shorten the time required for the metal to freeze.

#### Interchangeable Steels

This caption needs some explanation. When mention is made of "interchangeable machine parts" everyone knows exactly what is

meant. The day of caliper measurement is not so remote that many of us cannot remember when parts were literally "custom made" to fit a certain machine. If repair parts were needed, they had to be specially made or else extensively "fitted" to adapt them for use.

"Interchangeable steels" may be explained as follows: If a bar or a carload of a certain type of steel is purchased today and the buyer goes back for more of the same

Some years ago, in one of the plants of the Crucible Steel Co. of America, a 16,000-lb. heat of 12 per cent chromium steel was brought to composition and finished under the best type of reducing conditions. The heat was then held in the furnace for about three hours after it was ready to tap. During this holding time, hand shanks, each of about one hundred pounds of metal, were poured from time to time by carefully tilting the furnace. It was like pouring the cream from the top of a bottle of milk without stirring. The samples of metal thus poured all showed chromium from 9 to 14 per cent, and one sample, which represented the condition of maximum segregation, contained 26.38 per cent chromium. The heat was finally tapped and teemed and proved to be a very high-quality heat. The chromium content of the finished heat was 12.10 per cent, which was very close to the composition estimated for the heat before the long holding period. The steel maker will probably be interested in these results in relation to the author's remarks in regard to size of furnaces.

#### Abstract of Comments by Gilbert S. Soler, Manager of Research, Timken Steel & Tube Co.

**M**R. PALMER has very ably presented a complete picture of the electric melting process and has clearly explained the reasons why electric furnace steels should lead the way in metallurgical progress.

The construction of the electric furnace and the mode of heating definitely provide greater flexibility in operation than other types of melting. In the open-hearth process the metal bath is in thermo-chemical equilibrium with the slag during the oxidation period, but during the refining or deoxidation period the success of the operation lies in counteracting the force of the slag to attain equilibrium with the bath. Time of additions and temperature, and the composition, shape and viscosity of slag are variables that may prevent achieving uniform conditions and consistent repetition of practice.

On the other hand, in electric furnace practice the slag is in equilibrium with the bath during the oxidation period, and a slag of entirely different character is used during the deoxidation period. As a condition of equilibrium exists between this reducing slag and the metal bath, the variables of time of additions and temperature and the composition, shape and viscosity of slag do not affect the operation to as high a degree as in the open-hearth process. In addition, temperature can be more closely controlled in the electric furnace.

Adding the bulk of the alloying additions and deoxidizing agents to the furnace is an advantage in the electric process, for it allows complete solution of these elements, and, in the case of deoxidizers, provides sufficient time for any oxides formed to rise through the bath and into the slag. During tapping, less oxidation and slag contamination will occur in tilting electric furnaces than in stationary open-hearth furnaces.

In general, the electric furnace combines flexibility and ease of control in such a manner that high-grade steel with definite properties can be consistently produced.

six months hence, he expects to get material just like the first lot. If the two shipments are indistinguishable in their behavior in his shop, then those two lots of steel are interchangeable. If the second lot requires a higher hardening temperature, or a lower drawing temperature, or if it is harder to machine, or if the finished parts are not as tough, etc., then the two lots are not interchangeable.

Appreciation of the interchangeability in steels of the same chemical composition developed only when means of testing, comparing and using steels were advanced to a point where such variations could be distinguished. When all tool steel was hardened by eye in a blacksmith's fire, who could positively say that two steels bought months apart were different? There was too much question about the interchangeability of the heat treatment to support more than a suspicion of the steel. Today we look back and realize that some of those old smiths could see more in a piece of steel than the steel maker himself knew.

The first definite step toward making and inspecting interchangeable steels was the work done by H. W. McQuaid and E. W. Ehn in 1922 on carburizing steels. They were seeking the reason why different heats of low carbon steel of the same analysis responded so non-uniformly to case hardening. They found a test which has served ever since to sort steels according to their response to this operation. In 1930 a paper was published by G. V. Luerssen describing a test which would reveal the same type of variation in high carbon tool steel. Many other papers have contributed to making this one of the most fascinating chapters of modern metallurgy.

The past 15 years have found all steel mills digging deeply into this problem of making truly interchangeable steels, and the electric arc furnace has been at the apex of the wedge. We have learned that this process is truly a steel making process. So diversified are the possibilities and so delicate has become the control, that today we can literally make almost any kind of steel we want in the electric arc furnace. Show me a piece of Bessemer steel, or open hearth steel, or crucible steel, and I will turn it over to electric furnace technicians who will duplicate it,

(CONTINUED ON PAGE 84)



*Courtesy of the Midvale Co.*



THE first step in modernizing an open-hearth plant is to study all the "bottle necks" in construction and operation of the existing furnaces and plan how to overcome them.

Assuming that a furnace has an actual tapping capacity of 75 tons and it is desired to increase the capacity to 125 tons or more, the following steps can be taken to make such changes possible.

On a complete rebuild the old bottom may be torn out and chill boxes moved back as far as the center-to-center line of the furnaces allows. In addition the height of the chill boxes may be raised from 4 in. to 6 in. Sometimes from 3 ft. to 5 ft. additional length in the hearth may be obtained in this manner. If the charging machine

\* Abstract of paper and comments presented before the American Iron and Steel Institute, May 28.

peel clearance allows, an extra foreplate 4 in. to 6 in. in thickness may be added under the furnace doors to help deepen the bath.

By insulating the bottom of the hearth next to the steel pan with 2½ in. or more of insulation, the depth of the bath may be increased by at least an additional 4 in. to 5 in.

Another possibility may be to widen the furnace hearth toward the pit. If the concrete hearth foundations are in questionable condition, they may be reinforced with heavy steel straps. Particular care must be taken to rivet and weld the additional bottom plates for widening the pan to the plates in the hearth pan proper so that the expansion and contraction stresses of the furnace when in operation will not pull the bottom apart. Some furnaces, due to the building column design, cannot be widened, so attention must be con-

centrated on lengthening and deepening the hearth.

It is essential to increase uptake, slag pocket, and fan-tail areas as much as the end construction allows and decrease hindrances to flow of gases.

It is necessary to increase the checker capacity. This can be done by the use of two or three-pass checkers. If the furnace is considerably under-checkered, it may be necessary to use high-temperature brick, such as silica, single burnt magnesite, or high-alumina brick in the first pass in order to resist the high temperature of waste gases from the furnace. Some plants use new fireclay checker brick on the bottom, and old, seasoned brick in the top courses of the checkers.

Another plan whereby the checker chamber capacity may be materially increased is to install auxiliary checker chambers at the rear

# Recent Developments

## in Open Hearth

### Furnace Design and

### Operation\*

By L. F. REINARTZ

*Works Manager, Middletown Division,  
The American Rolling Mill Co.*

end of the existing chambers, such as is done in the Isley system.

The chief merit of this scheme is the total elimination of reverse valves if fixed fuels are used, or the elimination of air valves if producer gas is used as a fuel. The auxiliary system consists of additional chambers at the end of each set of air and gas checker chambers where ordinarily the reverse valves are located. Each chamber is connected by means of brick flues with a short venturi stack. A draft and pressure air fan is located externally near each stack and is operated by a 75 to 100 hp. motor. Checker work is permanently built into these chambers because the checkers can easily be cleaned by merely blowing out with air at the time of a furnace repair. It is advisable to insulate all the outside walls and roofs of these checker chambers and flues to the stacks, which are usually entirely

underground, with 6 in. to 9 in. of insulating concrete. Thus the infiltration of air always attendant to the use of reverse valves, and the cooling of gases because of the water cooling of valves, is entirely obviated.

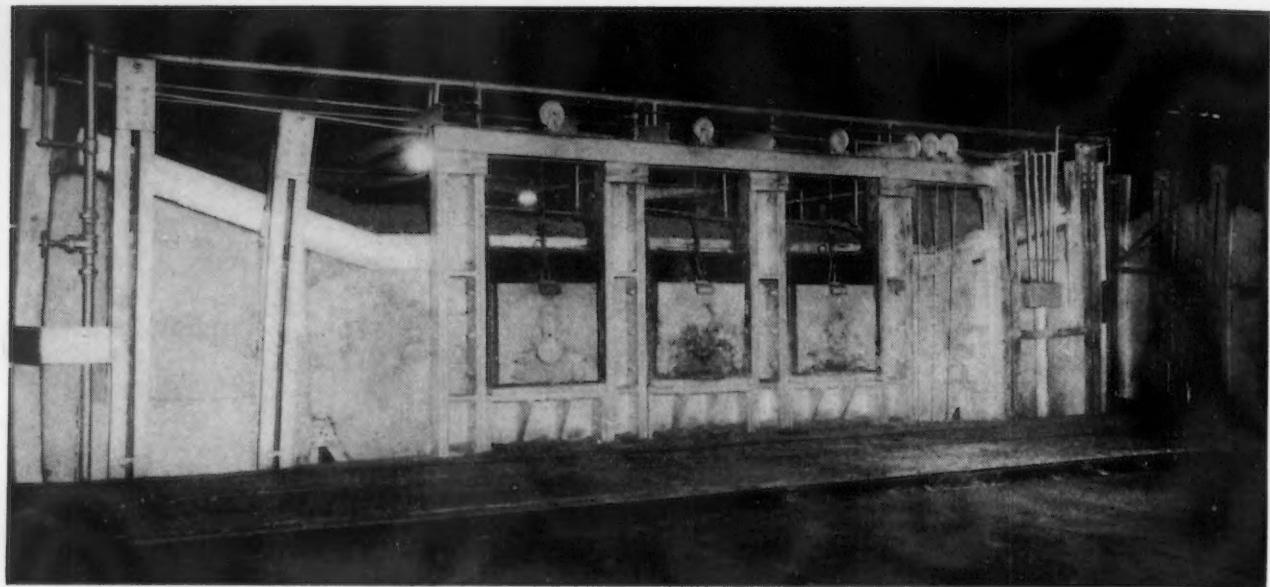
If after such an installation is made it is deemed advisable to increase the checker capacity still further, this scheme may be combined with the multi-pass idea in the main checker chambers, because the Isley fans will have sufficient power to overcome the additional friction load.

If local conditions preclude the use of the Isley system, and old-style water-cooled valves with many right-angle bends are in use, it is essential to redesign the flue layout for straight-line damper valves, such as water-cooled or heat-resisting alloy dampers. Such valves will go far to increase the draft and improve furnace oper-

ations. Valves must be carefully installed to guard against leakage of air or gas, or stresses which might cause the damper slots and dampers to spring leaks in the welds. They must be inspected and cleaned out regularly. Good maintenance is a prerequisite to the successful use of damper valves.

If the draft from the existing stack is not sufficient to give the proper draft for an enlarged furnace, this condition may be remedied either by placing a booster fan in the stack about one-third the distance from the top, or a waste heat boiler may be installed which will help to conserve the heat and at the same time give better draft control.

Metal-cased or other basic brick back walls have given increased life, but are not as economical as sloping back walls which have been installed in many furnaces, and this latter construction has almost



Front view of a completely insulated 30-ton basic open-hearth furnace.



become a standard in this country. Such walls eliminate expensive delays and repairs and improve operating conditions, particularly around the tap holes, during the summer months. They should be installed by all means.

Heavy slab buckstays materially decrease furnace maintenance cost because, if made heavy enough, say with an area of 5 in. by 15 in., it is improbable that they will ever have to be replaced. They usually can be rolled in any blooming mill. Such heavy buckstays keep the furnace superstructure in line and allow the use of heavy cast iron or steel skewback channels, which in turn make it possible to install 15-in. silica brick roofs with 18-in. silica brick reinforcement ribs. These heavier roofs materially prolong the average campaign of a furnace.

Higher roofs should be considered because they allow more space for the increased scrap iron charge and for better flame travel, especially during the charging and early melt-down period.

In recent months, a report has been received from Europe in which a statement is made that a new silica brick, called agate brick, has been developed for furnace use in Spain. This is a silica brick containing a high percentage of tridymite, and a slight admixture of iron oxide. The claim has been made that such a brick, although considerably more expen-

sive than an ordinary silica brick, will double the life of a furnace roof. It is said the brick does not soften until a temperature of 3128 deg. F. has been reached.

#### Insulation

One of the greatest aids to the improvement of the operation of an enlarged furnace has been adequate insulation. This problem must be given careful and intelligent study, and the greatest improvement will be made if the furnace system is first completely sealed below the floor level against infiltration of cold air.

During recent years, the tendency has been to try to improve fuel saving by eliminating sealing mixtures and covering exposed brick surfaces with insulating materials having low thermal conductivity in order to reduce the heat loss by conduction and radiation as well as the loss due to air infiltration.

A successful practice in insulating flues to the valves and the stack has been to pour around them a 9-in. concrete wall containing insulating materials such as one part Portland cement and six parts of insulating aggregate,  $\frac{1}{4}$  in. to 1 in. in diameter, and about two parts insulating powder mixed with water. Such material will replace the red brick retaining walls usually built on the outside of the fire brick flues. This insulation

has about one-fourth the thermal conductivity of clay brick, costs little more than red brick, and is practically airtight, except where cracks form due to unequal expansion. These cracks should be sealed after the furnace has been in operation for several days.

Some steel plant operators, in order to save initial expense, insulate the slag pockets, fan tails and checker chambers with a plastic insulation which is trowelled to a depth of about 2 in. directly on the brickwork. Alloy nails or light angle irons are sometimes used to hold it in place. An expanded mica insulation having a clay binder is most commonly used for this purpose. Slag wool, asbestos, sil-o-cel powder, powdered alumina, and other materials may be used as insulators. They have as binders colloidal clay, sodium silicate, organic binder or asphalt. These materials have a thermal conductivity about one-sixth that of fireclay brick and cost about 12c. per sq. ft. per inch of thickness, or about 24c. per sq. ft. for a 2-in. lining. Such insulation requires constant attention, and must be replaced at frequent intervals because the coating separates from the brick walls and often drops off in large chunks.

A better method, although costing considerably more than the initial side-wall insulation, is to pour approximately a 5-in. wall of insulating concrete on the outside of

existing checker chamber walls, using Portland cement as a binder and any of the above insulators as an aggregate. This material has a thermal conductivity of about one-fourth that of fireclay and costs about 10c. per sq. ft. per inch thickness, or about 50c. per sq. ft., for the coating. At one plant, in order to avoid air infiltration at the buckstays where no insulation could be applied, pieces of sheet steel were slipped between the buckstays and the regular brick-work with the edges projecting so that they could be imbedded in the insulating concrete when it was poured. Such insulation has been in use for three to four years without serious cracking or deterioration. The upkeep cost is therefore very low. In order to save heat it is advisable to have 15-in. fireclay brick in the checker chamber roofs and 4½-in. insulation on top of these brick. A slurry should be added to fill all the cracks.

It is usually possible, at the time of a complete rebuild to the bottom of the slag pockets, to incase the slag pockets and fan tails

with  $\frac{3}{8}$ -in. steel plates. An insulating powder is sometimes poured between the plates and the brick work of the fan tails.

Slag pockets may be insulated with refractory insulators that will stand a temperature of 2500 deg. F., with care being taken not to use, in this area, insulating brick having any lower temperature rating than shown above.

Uptakes and ends of the furnace may be insulated with refractory insulators, insulating silica brick, or plastic insulation, sometimes used on checker chambers. It should be noted that it is inadvisable to insulate the end walls above the floor unless the roof is also insulated, or unless, due to local conditions, a short flame is developed in the furnace. The possibilities for heat conservation in this area are very great.

#### Roof Insulation

Roof insulation is a debatable subject. It is realized by all that the greatest fuel saving may be made if the roof can be insulated

safely. Many companies have developed pyrometric controls for indicating the inside roof brick temperature on a large recorder which can readily be seen by the first helper. The claim has been made that such a control allows the first helper to run his furnace more uniformly and at an average higher rate. Others contend that the furnace man is tempted to run his furnace on the "cool" side to protect the roof and thus decrease the efficiency of the furnace. Still others claim that where light scrap is charged, and particularly where low-carbon steels are being made, the burning or "sluffing off" of the roof brick is increased, and the insulation is not economical.

A method of roof insulation which has been successfully used in some shops is the installation of light-weight silica brick,  $2\frac{1}{2}$  in. in thickness, on top of the entire roof from end to end. Then 2 in. to 3 in. of granular insulation is applied and finally a  $\frac{1}{2}$ -in. coating of plastic insulation is placed on top to hold the granules in place. It is not a good plan to place gran-

Modern sloping back wall construction for open-hearts.



ular insulation directly on the roof because the temperature at the interface between the silica brick and the granules may become high enough to decompose the insulation. At times, this has caused fluxing of the silica brick in the roof as well as ruining the insulation. On the other hand, the temperature gradient through the insulating brick is sufficient to protect the granules against excessive temperatures. Vermiculite granules mixed with colloidal clay seem to give best results. Insulators containing slag wool or sodium silicate should not be used on an open-hearth roof because of the fluxing hazard.

The claim is made that when roofs are completely insulated, flame volumes will be decreased and it is therefore easier to keep the flame away from the roof. Direct impingement of the flame on an insulated roof causes much more destruction than on uninsulated roofs. When a roof has been insulated, the entire silica brick roof is kept above the 1400 deg. F. silica brick transformation point, and no changes in crystallization or volume occur during the operation of the furnace, thus eliminating most of the spalling and breakage of roof brick due to expansion and contraction always prevalent with uninsulated roofs. Longer roof life is to be expected if there is no direct impingement of flame on the roof. Only experimentation in each plant will prove the value of such insulation. The experiences of several plants indicate that roof insulation in plants making low-carbon steels should be tried out on one furnace at a time.

#### Savings From Insulation

Insulation, if properly applied, will reduce cold-air infiltration, and also prevent loss of heat in the checker chambers. This will increase checker chamber temperatures, which, in turn, will increase the temperature of the air for combustion passing through the chambers on its way to the ports. Higher preheat of the air will produce hotter, shorter flames—this will mean faster melting, better furnace temperature control, less flue dust going to the slag pockets, and less furnace repairs.

Actual savings from insulation vary considerably due to the condition of the furnace being insulated,

the materials used, the amount applied, and the skill used in the application. A fair average saving for insulation below charging floor level will show about 7 per cent decrease in fuel consumption and about 5 per cent increase in melting rate. One-half of this saving can be attributed to sealing against infiltration and the other half to insulation itself. In case furnaces, previous to insulation, have had a great amount of infiltration of air, the savings may increase to 15 per cent or more. One combustion engineer has figured a 15 per cent saving on fuel if the furnace above the floor level is insulated completely, but no increase in produc-

tion. He claims that faster heats can be made if the furnace is insulated above the floor level but only with increased refractory costs. It is better to try to maintain a regular production rate, and make all the savings from insulation above the floor level in lower fuel costs.

H. C. Barnes, a steel plant engineer, has made a tabulation showing the savings in heat that may be made in various parts of the open-hearth system. He has assumed that the fuel rate will be reduced in amount equivalent to the reduction in radiation losses while maintaining existing furnace temperatures, rate of production,

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#### Abstract of Comments by C. D. King, Chairman of Open-Hearth Committee, United States Steel Corp.

To open-hearth operators interested in producing larger sized heats, the author has presented an interesting recital of methods which will prove of value. By reducing the size and increasing the elevation of chill boxes; by the use of additional fore plates; insulation of bottoms; widening hearths where possible; methods are available for increasing the size of heats. This practice has been in operation for many years at numerous plants and we cite as one example the fact that South Chicago No. 2 tapped 44-ton heats in 1904; 70-ton heats in 1910; and 100-ton heats in 1928.

Mr. Reinartz has recognized the desirability of avoiding undue constrictions in the furnace system; the use of proper valve design; sloping back walls; modern heavy buckstays; sealing and insulating materials; improved port design; improved refractories; and among many other important items the use of various types of controls such as draft, combustion, reversal, and temperature. I am fully in accord with Mr. Reinartz' views on these items and their relative importance in improving operations, but, perhaps, I may be permitted to entertain a difference of opinion on some minor points.

In the first place, one cannot assume in any program involving increased size of heats by increased depth of furnace that the question of pig iron character and percentages can be entirely disregarded. It is a fundamental principle that deep furnaces lend themselves admirably to the melting process which, in other words, means higher scrap charges. By the same token the more shallow type of furnaces are more suitable to refining operations which, in the sense used, means higher pig iron charges. Where furnaces must be sufficiently flexible to use either the low or high pig charge, the hearth areas must be ample for this purpose, and this question is of prime importance in considering the permissible changes in hearth depth.

I do not entirely agree with Mr. Reinartz' remark that a pig iron charge of a modern furnace will vary from 30 to 50 per cent, depending upon whether low or high-carbon steel is made. It is a more common practice to adjust the ore without any changes in the pig iron percentage to accommodate high or low-carbon steels, and where pig iron charges are so chosen the underlying reasons are economical rather than metallurgical. In this country pig iron charges may vary from zero to as much as 70 per cent, and in Mexico, Australia, and England hot metal charges as high as 80 per cent are successfully employed by recognizing certain physical and metallurgical requirements.

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and refractory life. This is the only basis on which insulation can be used without increasing furnace repair costs. Therefore, the only real improvement that can be expected will be in fuel cost.

#### Insulated Bottoms

In recent years more attention has been given to the construction of new or rebuilt open hearth bottoms. Quite a number of plants have insulated their bottoms in order to decrease heat losses and, at times, to decrease the total thickness of refractories in the bottom in order to obtain more space for melting increased charges. High-fired insulating

bricks are preferable to insulating concrete because of less thermal conductivity, greater strength, and their ability to withstand higher temperatures.

A typical uninsulated bottom has 40½ in. of bottom consisting of 15 in. of fire clay brick, 12½ in. of chrome brick and 13 in. of fused magnesite. An insulated bottom in a furnace of the same size has 2½ in. of high-fired insulating brick, 12 in. of fire clay brick, 12 in. of chrome brick and 12 in. of fused magnesite.

Some almost unbelievable figures for fuel consumption in insulated furnaces have been reported. A 25-ton cold metal casting furnace

completely insulated is said to make steel on a 3,000,000 B.t.u. per ton basis. Large steel melting shops have reported that 125-ton furnaces have made low carbon steels using not over 3,500,000 B.t.u. per ton of ingots.

It should be mentioned that if insulation is to be permanently efficient, a crew of maintenance men, equipped with refractory cement guns, must be working constantly to fill up expansion cracks, and keep down air infiltration. The composition of the material used to make the slurry may be as follows: 8 wheelbarrow loads of silica sand, 6 sacks of Portland cement, and ½ sack (40 lb.) Goulac (an organic binder similar to glue).

The material is mixed dry, forced by air pressure through the gun and the hose to the nozzle, where water is added to give the slurry the proper consistency. The material is used for maintenance purposes to seal against air infiltration at the fan tails, slag pockets, uptakes, furnace ends, and checker chamber roofs.

The design of the ports of a furnace, particularly when using producer gas or a combination of coke oven gas and blast furnace gas, is very important. Venturi ports have been proposed and undoubtedly give good results when using the above mentioned fuels. Brick-lined, water-cooled producer gas ports also give very good results.

Oil, tar, and some natural gas furnaces are operated by the use of end burners. The tips of these burners are usually protected by small welded water-cooled tanks or the burners are water jacketed. In the case where oil or tar is used as a fuel, steam or air is used to aspirate it. The oil, if of high viscosity, is heated to 120 to 150 deg. F. The air or steam is passed through preheaters usually located in the flues leading to the reverse valves. Steam will give best results when preheated to about 500 deg. F. The fuel and the aspirating medium are injected into the furnace at from 75 to 110 lb. pressure. Natural gas may be burned at low pressure from side burners, in which case a very low knuckle is used in the furnace, or the gas may be burned from the end through a pipe at about 40 lb. pressure. In the latter case, it

I find Mr. Reinartz' remarks on checker capacity, waste heat boilers, and the use of additional checkers in the flues on some types of furnaces, of particular interest. The inference I draw from this discussion is that it is both theoretically possible and desirable to reduce the waste gases leaving the furnace checkers to so low a temperature that waste heat boilers could no longer be considered. This viewpoint has friends not only in this country but abroad, and in spite of extremely thorough and competent investigations by many engineers in this country showing the fallacy of this conception, many operators still hold to this theory. Low temperatures on the outgoing end of the checker chambers can be obtained in four ways.

- (1) Incorrect pyrometric readings.
- (2) Excessive leakage and infiltration on the outgoing end.
- (3) Unusually long checker chambers which, through additional radiation, reduce the temperatures of the outgoing waste gases, but to no practical benefit.
- (4) Actual reduction in temperature, although of minor character, by completely sealed, insulated, efficiently operated furnaces with a comparatively low fuel consumption.

I believe it to be evident, from actual results as well as many comprehensive investigations that, except in rare instances, furnaces are not under-checkered so much as they suffer from faulty distribution of air and waste gases. In many cases the means of correction lies in the hands of the open-hearth operators and does not involve any additional checker length. I do not believe that increased checker length will *per se* solve inferior distribution; on the contrary it may frequently exaggerate an already faulty distribution. The criterion of good checker design is the difference in temperature between the preheated air leaving the checkers and the waste gas entering the checkers. In general, a smaller difference between the temperature of the waste gas and the regenerated air at the hot end of the chamber indicates better checker design. Another criterion of good checker design is the comparatively small swing in temperature of regenerated air during the reversal. A good checker design involves a comparatively thin checker brick with the smallest possible vertical holes which will not clog excessively during the furnace campaign.

The importance of distribution of waste gases and air over the cross-section of the chambers becomes more apparent to operators with the reduction in fuel rate practised in recent years, since all other factors being equal, the efficiency of heat transfer is dependent largely

(CONTINUED ON PAGE 42)

has been found to be good practice to supplement this fuel with 6 to 10 gal. of oil per ton to give luminosity to the flame and thus speed up heat transfer. The Rose port may be used with any fuel, but it is particularly adapted to producer gas and a mixture of coke oven gas and blast furnace gas. The removable port provides small areas on the intake for greater combustion efficiency, and provides large areas on the outgoing end for handling the waste gases.

#### Furnace Control

Until recent years, the success or failure of an open hearth furnace depended on the skill, knowledge, and interest of the furnace man. This dependence entirely on the human element was satisfactory where a plentiful supply of intelligent and conscientious workmen was available. Unfortunately, this condition has not always prevailed in many plants. It, therefore, became necessary to devise aids and checks to the human element.

In England a liaison between the Research Council of the National Federation of Iron and Steel Manufacturers and the makers of instruments has been perfected to study this problem. This cooperation has shown a need for and awakened an interest in designing instruments specifically to solve definite control problems in the open hearth plant. Thus closer collaboration between the operators and instrument makers has been assured. In this country the Open Hearth committee of the American Institute of Mining and Metallurgical Engineers has functioned in much the same way.

Instruments are used for two purposes, control and investigation. Indicating and recording meters may be bought which will show the fuel being used currently as well as a chart record over a 24-hr. period. Other meters show the stack and checker chamber draft readings as well as the air pressure on the incoming side. Pyrometric tubes may be installed in each checker chamber, usually above the checker brick, and also in the stack, showing continuously the temperatures at these various points in the system.

Combustion control equipment of various types is now on the market. Claims are made that they cor-

rectly proportion the amount of fuel and air for best flame conditions in the hearth. It is noticeable that all those who make such claims insist first on proper sealing and insulation.

One open hearth superintendent who is satisfied that combustion control pays has summed up his conclusions as follows:

"The equipment we now have gives us certain definite advantages:

(a) Automatically reverses the furnace at a predetermined temperature difference in the checker chambers. This is set by the first helper.

- (b) Holds the amount of fuel input to the furnace constant wherever set by the local management.
- (c) Supplies the necessary amount of combustion air in accordance with the amount of fuel being burned.
- (d) Holds a predetermined furnace pressure or draft, whichever the case may be.
- (e) Affords means of varying the ratio of gas to oil and still holds the combustion air at the proper point.
- (f) Affords means of raising or lowering the combustion air, and then holding to that

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on the velocity of the waste gas and air. The plants with comparatively long checkers and a large cross-section area of chambers were, in many cases, forced to resort to two-pass checkers; they may even have considered reducing the checker length of standard design in order to improve the distribution of waste gas per square foot of the cross-section area.

Granting the desirability of operating an open-hearth furnace so efficiently that low waste gas temperatures will preclude the consideration of waste heat boilers, nothing has been done which warrants this possibility from either a theoretical or practical standpoint. The choice of waste heat boiler installation does not lie with the open-hearth superintendent; it is a plant problem whether steam produced in this manner is more economical than direct firing of boilers. Since the sensible heat in the waste gases represents as much as 40 to 60 per cent, or more, of the calorific value of the fuel, the only question which must be answered is, does it pay to conserve it in the form of steam or shall it be wasted? Studies and experience definitely confirm that an efficient open-hearth plant which is also provided with waste heat boilers will operate both units as an integral system to maximum advantage, and that an efficiently operated waste heat boiler is often a definite criterion of an efficient, tight furnace system. Even with the lowest fuel consumption and efficient operation of a furnace, a proportionately high recovery of steam can be obtained in terms of calorific value of the fuel used.

I recommend to all engineers and open-hearth operators Mr. Reinartz' very interesting survey of methods of insulating open-hearth furnaces. Complete sealing and insulation below floor level are an accomplished fact, whereas complete insulation above floor level, and particularly roof insulation, are still in the experimental stage at many units. If we look upon this latter development objectively, we are forced to conclude that too many examples of complete, intelligent, and efficient insulation now exist to question the value of such a program.

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#### Abstract of Comments by V. J. Pazzetti, Jr., Superintendent of Saucon Division, Bethlehem Steel Co.

M. R. REINARTZ has given a very interesting and exhaustive summary of the plan along which progress is being made in open-hearth design and operation. This should be a revelation to those who are not aware of the tremendous strides made in this field in recent years. The tables given in his paper are an important contribution to

fuel-air ratio when the fuel rate is changed.

(g) Has selector switches for changing from automatic to either push button or manual control of the furnace. If it is desired to go off automatic reversal it can be done without affecting the automatic combustion control. Or if it is desired to go off automatic combustion control and still retain automatic reversal it can be done by merely turning the proper selector switch, of which there are two, to whichever position or method of operation is desired. In fact the

furnace can be operated by almost any combination of methods that is desired.

"With the above equipment installed on five furnaces we have been able to increase our tons per hour and decrease the B.t.u. per ton."

#### Oxygen Recorders

Many schemes have been tried to control the excess air in the waste gases of an open hearth furnace. In recent years the direct determination of oxygen by the use of oxygen recorders in Europe and in the United States has given good results in plants where this scheme has been given a prolonged trial.

The instrument may be used independent of the type of fuel. The oxygen content of the waste gases is indicated in the form of a continuous curve on a chart and at the same time is shown on a large control recorder in full view of the first helper. One oxygen apparatus automatically takes measured waste gas samples passing by the instrument and determines oxygen at regular intervals at about 450 deg. to 575 deg. F. by catalytic combustion of a hydrogen-containing, oxygen-free gas. Changes in volume due to the combustion of hydrogen to water serve as a yardstick for the volume of oxygen present.

The apparatus should be installed close to the place from which the gases are drawn and protected against extreme variation in temperature. For open-hearth control one instrument may be installed which may take samples alternately from each end of the furnace.

A very interesting and instructive series of tests was made in Germany showing that heats which melted with an average of 2 per cent oxygen in the waste gases leaving the hearth of the furnace showed 14 per cent greater B.t.u. consumption than when the waste gases showed more than 3.6 per cent oxygen. The average output of the furnace using such high oxygen content waste gases was 12.2 tons per hr. against 11.6 tons per hr. for the lower oxygen group. If the oxygen increased to 4.5 per cent, then the tons per hour decreased and the fuel consumption increased. Similar results were obtained in an American plant where the installation of a well-known control was unsuccessful because it was operated with very little excess oxygen in the waste gases. Tons per hour decreased and fuel consumption increased. When the control was removed, better tonnage and fuel figures were again shown.

the data necessary for evaluating the economic considerations which really control the development of furnace design.

The importance of providing strong furnace bindings and of keeping them in proper alignment at each rebuild is well brought out in Mr. Reinartz' paper and should be emphasized at all times.

The design of checker chambers still calls for careful study in order that the amount of checker volume provided can be completely and uniformly used. Care must also be exercised that velocities at the top of the checkers are not up to a point which causes destruction of the brick.

The amount of checker volume provided and the question as to the application of forced or induced draft, automatic control, waste heat boilers, etc., should be decided after careful evaluation of such economic considerations as cost of materials and labor, need for plant steam, and price of furnace and boiler fuels.

There seems little reason to question the importance of insulation on the entire outside surface of the furnace with the probable exception of the front wall. The saving of 7 per cent in fuel consumption given in Mr. Reinartz' paper seems conservative in the light of the experience with recently insulated furnaces, with account taken of the known heat losses and air infiltration losses at different parts of the furnace.

The experience of at least one plant with the use of slag wool has been vastly more satisfactory than is indicated in Mr. Reinartz' paper. At this plant the 13-in. bonded roofs are insulated as follows: 1½ in. silica sand (98 per cent) bonded with Goulac; 1½ in. silica sand plus 25 per cent of ground cork; 1 in. to 2 in. slag wool insulating cement. In this plant the roof life was increased from an average of 288 heats to an average of 423 heats with no change in roof design other than the insulation and the installation of radiation-type, roof temperature control pyrometers.

In this same plant a large saving in fuel was effected and the time of heats was materially shortened by the ability of the insulated furnace to come back quickly after gas shutdowns. These furnaces have come back with 11 and 12-hr. heats after a 60-hr. shutdown with "soakers" charged. On some walls insulated with slag wool cement there is a slight shrinking of 1/32 in. to 1/16 in. away from the brick, which is considered adantageous. It is not found necessary to patch continuously the insulation except on end walls when they are worn quite thin, and then the insulation is usually left off until the wall is patched. It is estimated in this shop that the saving by insulation is about 12 per cent, of which 8 per cent is due to preventing air infiltration.

In some open hearth plants the  $\text{CO}_2$  content of the waste gases as they leave the furnace is determined. The best percentage of  $\text{CO}_2$  at different stages of the heat must be determined in each plant by experiment. There seems to be an opinion that electrical methods for determining  $\text{CO}_2$  have not been satisfactory.

A scheme for reversal of the furnace by temperature differential in

the checker chambers gives very good results. The question whether this control should be made automatic is subject to debate. Some operators believe the furnace will work more smoothly and give a first helper an opportunity to do extra work if reversals are automatic. They believe that by taking the operations out of the hands of the first helper they will eliminate

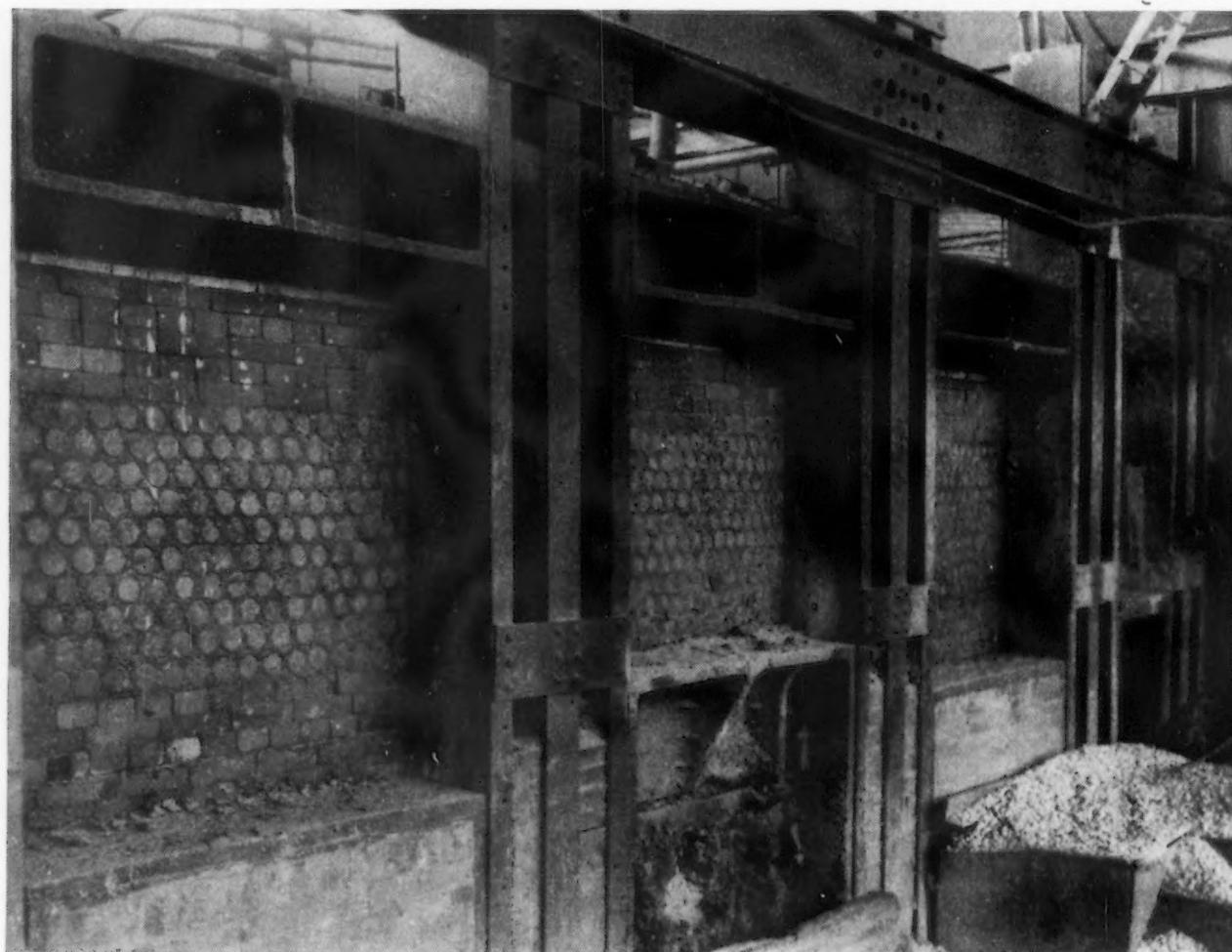
ume is quite practical. Pressure determinations in the hearth of the furnace, fan tails, and uptakes, particularly in producer gas furnaces, will show whether there are draft restrictions.

Stack draft control is an essential adjunct to every rebuilt furnace, especially from a fuel saving standpoint. W. C. Buell, open hearth design expert, says: "The

affected seriously by such occurrences.

#### Temperature Control

The disappearing metal filament optical type of instrument appears to give the best metal temperature readings in the pit. Care must be taken to calibrate the instrument properly at the start. Readings must be taken when the stream of



View of open-hearth having a metal-cased back wall.



some of the variables that have existed in furnace operations. Others believe the system should never be independent of the first helper's attention just because of these variables. In most cases, signals will give the first helper notice to reverse the furnace, and good results may be obtained when reversing the furnace manually. When coke oven gas, blast furnace gas, or natural gas volumes can be determined, measurement of air vol-

motor operation and the adjustment of air inlet valves and the stack dampers should be completed as the first and most important step of any control program and prior to the installation of any refined apparatus." Automatic control of stack draft may not be perfect because it depends on the pressure in the furnace, and raising of charging doors may affect this control if set too closely, but in most plants, the control is set so as not to be

metal, at the spout or at the pouring floor, is reasonably free from fumes. The stream must be smooth—not irregular or straggly. The observer should sight on the metal as nearly on the same spot as possible. In taking temperatures of the metal flowing from a ladle, view the metal from the windward side as close to the nozzle as possible, and keep the cover glass for the lens clear and unstreaked.

In taking checker chamber tem-

peratures a suction pyrometer gives the most accurate results. However, no refractory is available for construction of such an instrument for other than occasional check tests, so radiation pyrometers must continue to be used. Such a pyrometer is usually sighted on the end of a refractory tube about 3 ft. long inserted horizontally in the upper part of the checker chambers.

Fitterer's pyrometer for measuring roof and bath temperatures is still in the experimental stage but it may ultimately be developed into a practical tool. Other roof temperature controls are in operation on quite a number of furnaces. Most of these controls measure the temperature of the roof about 1 in. from the inside surface. The claim is made that thermo-tubes have given good results, and that the maintenance cost of the equipment is very low. In most plants at the present time, the first helper must still rely on the "spoon" test, and the "rod cut" to determine bath temperatures.

Instruments once installed must be maintained by a competent staff to keep them in good running order. A combustion staff man should be available to help interpret charts and records and make recommendations for improved technique.

### Results

Though furnace capacities in some plants have been increased 25 to 75 per cent, metallurgists have not been able to find any inherent quality troubles attributable to such deeper baths when making low carbon steels. Some metallurgists are very much opposed to making alloy or high carbon steels in furnaces having very deep baths.

Insulation has decreased fuel consumption.

Increased capacity and insulation have increased the operating and metallurgical efficiency of the open hearth.

Less pig iron and more scrap per heat have been made possible. Pig iron may be decreased from 10 to 20 per cent, depending on the efficiency of the combustion. This is not an unalloyed gain at this time because of increasing percentage of non-ferrous metals such as copper, chromium, nickel, etc., now prevalent in purchased scrap. Tons per hour in rebuilt furnaces may be increased from 20 to 30 per cent, depending on the kind of steel being made. Fuel consumption may be decreased to 4,000,000 B.t.u.'s per ton or less. Furnace repairs cost will be decreased considerably. Total operating costs may be reduced from \$0.50 to \$1.50 per ton of ingots.

New furnaces, tapping around 175 to 200 tons per heat will not show material decrease in B.t.u. consumption over well insulated 125 to 150 ton rebuilt furnaces, but the tons per hour on these large furnaces will range from 13 to 16 tons per hour compared with 9 to 12 tons per hour in the rebuilt furnaces. Repair costs are reported to be as low as \$0.25 per ton and operating cost may be slightly lower than shown by shops having efficient rebuilt furnaces.

It should be understood, however, that the capital expenditure in rebuilding an old shop is usually very much less than obtaining a similar additional capacity by building new open hearth furnaces.

### Furnace Bottoms

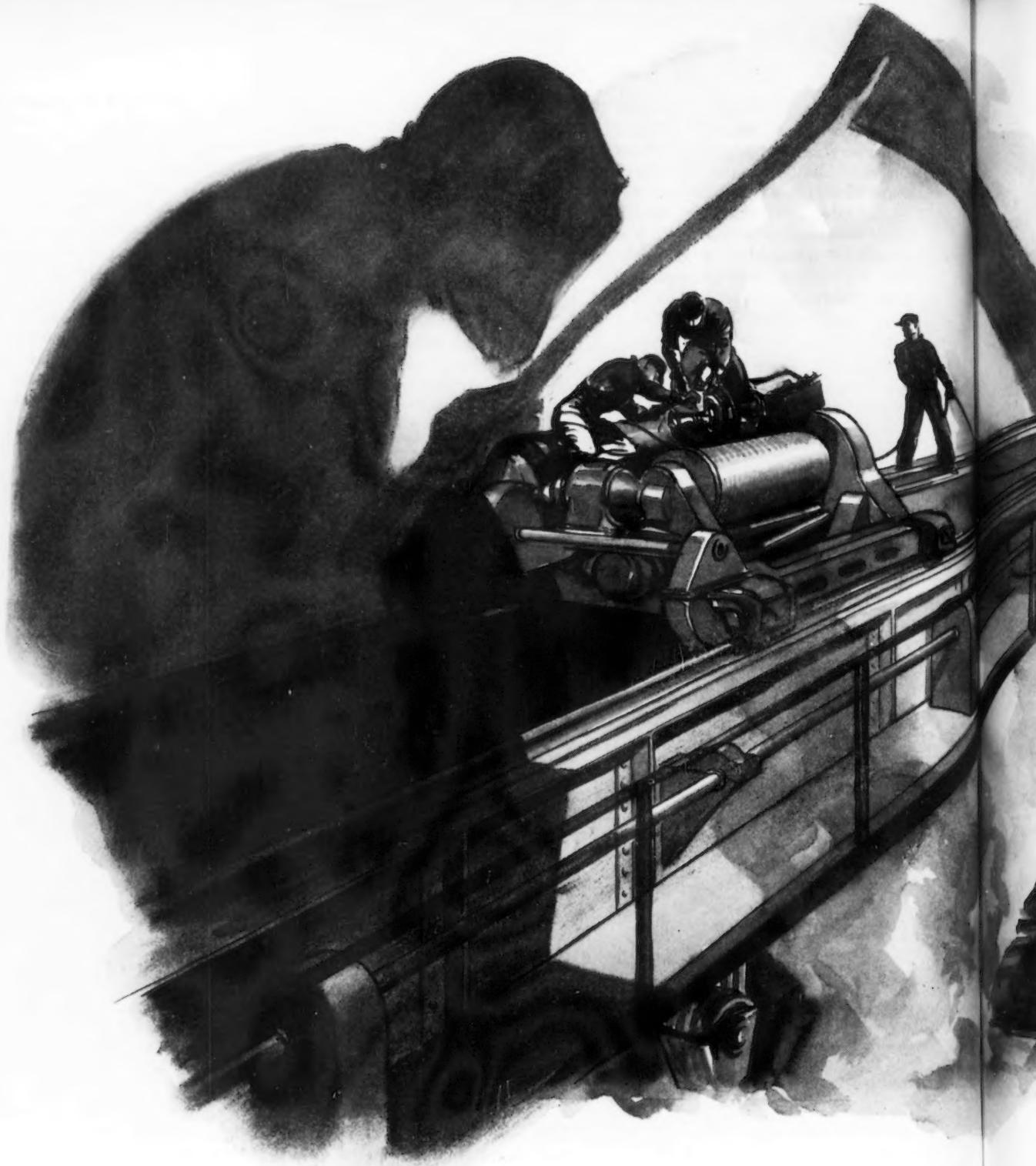
Building a new bottom in an open hearth furnace is an important operation because the quality of the steel made on such a hearth in succeeding years may depend on

how carefully the bottom was sintered into place.

High grade, sized magnesia is mixed with 15 to 20 per cent clean, ground open hearth slag. A  $\frac{1}{4}$  in. to  $\frac{1}{2}$  in. layer is sintered all around the banks and on the bottom directly on the chrome or magnesite brick bottom. Each batch is heated until it is properly sintered. This operation is continued until a homogeneous hearth 12 in. thick or more has been sintered in. Then the furnace is cooled down to about 2000 deg. F, and after that heated up again. Now about 20,000 lb. of lump slag are charged into the furnace and melted. The molten slag is rabbled over the banks and then tapped out. After cooling the furnace for about an hour, it is heated up again.

The furnace is now ready for operation. As each heat is tapped care must be taken to drain the bottom completely. All puddles of steel and slag must be removed. As time goes on, uneven conditions may show up on the bottom. It may then be necessary to make a drain to the tap-hole by means of oxygen or air blown through a one-inch pipe to remove steel from low spots. After that the bottom must be properly repaired with magnesite or a prepared dolomitic product. If steel has accumulated in the bottom for some time and cannot be drained out, it may be advisable, in order to maintain quality, to shut the tap-hole after a heat has been tapped, and charge a "wash heat" of pig iron to melt out any oxidized steel in the bottom. After draining the bottom, 6 in. to 8 in. of magnesite may be sintered on the bottom, and it is ready for another campaign. This practice, though expensive, will prevent "boils" on old steel in the bottom with its disastrous effect on ingot quality.





In attempting to catalog the factors affecting the safety of maintenance operation, I would list the following:

- A. Attitude of management.
- B. Type and intelligence of the foreman.
- C. Nature of the maintenance work contemplated.
- D. Planning of the work and equipment required.
- E. Caliber of maintenance men used.

#### F. Safeguards and safety measures employed in the work.

I have tried to include nearly all classes of repair work when enumerating the above six generally most important considerations which will be considered more at length. There are several important lessons to be learned under each of these six headings, if we are not only to minimize the hazard of maintenance, but to actually make such work reasonably safe for the men engaged in this most

necessary and ever present department of industry.

#### Attitude of the Management Toward Safety

No general campaign for safe operation and maintenance can gain much headway in a plant or organization unless everyone feels that the management is back of the movement wholeheartedly, and not just on a perfunctory, "the proper thing to do," basis. An organization will invariably appre-



# Minimizing the Hazards of Maintenance\*

• • •  
By A. J. STANDING

*Superintendent Electrical Department  
Bethlehem Steel Co., Bethlehem, Pa.*

• • •

be expected from a loyal force of employees.

While I have given a rather important place to the type and intelligence of the foreman, I am also assuming that back of such a leader there must be the active interest and support of his department head, who must be safety-minded, if he is to give the industry he serves the full measure of service which it has every reason to expect. The attitude of the department superintendent toward safety is invariably reflected in the attitude of the foreman toward the safety and efficiency of his men. There is nothing that will defeat the ideals of safety more completely than the real or apparent indifference of a superior when approached by a foreman with a suggestion or request. If the results asked for cannot be obtained the manner in which the refusal is explained to the foreman and men will oftentimes be the very instrumentality for preserving their interest and stimulating their endeavor to discover some other way of achieving the end desired.

With the department head thinking safety of maintenance the foreman will almost automatically consider the nature and extent of the hazards to be successfully overcome on each job that is undertaken.

The nature of the maintenance work and the planning of the job and equipment required are so closely associated that they can well be considered jointly.

Under the heading of nature of work, an important safety feature is the demand for speed which sometimes overshadows in the mind of the producing department, at least, the normal considerations of safety, which would come as the result of more careful thinking. Under such conditions it is imperative that maintenance foreman shall not permit the men to go into a job improperly equipped and over-stressed on speed, rather than calm judgment.

We have all seen instances of this very nature when perhaps the loss of a portion of the product, important as that may be, must be weighed against the possible loss of life or serious accident to a repairman, resulting from undue haste. The writer recalls vividly an instance when the broken drum shaft of a ladle crane caused the drum to jam between the girders with a ladle of hot metal, high in the air, about to be poured into a mixer. There was only one sensible thing to do and that was to move the crane bridge out of the way and let the metal cool before attempting to remove the ladle.

(CONTINUED ON PAGE 60)

ciate sincerity of purpose when it is present and will automatically adjust their thinking along the same lines. Any management must consider costs, but accidents prevented and lives saved are the outstanding objectives of safety, to be attained as economically as possible, and when these features are stressed, results are certainly to

\* Presented at a meeting of the Philadelphia Section of the Association of Iron and Steel Electrical Engineers, Philadelphia, April 4.

# Labor Relations in the Steel Industry

(CONTINUED FROM PAGE 31)

the establishment of safe and satisfactory working conditions. We all know that we can only do our best work when we are provided with good tools and with safe and comfortable working conditions.

The third plank of the platform has to do with confidence as it is affected by factors other than the two planks I have mentioned. Confidence building extends outside the gates and into the community. Management in the major portion of the steel industry has been a strong advocate of those things in the community which make for better homes, better educational facilities, and all that contributes to a healthful, happy and constructive community life.

What men earn has always been and will always be a subject of paramount importance to the workman, just as it is to you and to me. How has our industry measured up? In 1895, with men in our industry working a 12-hr. day, the average rate paid per hour was 21c. Today, the average steel workman earns 65.8c. per hr. for an 8-hr. day. This is an increase of more than 200 per cent in hourly rates alone. Obviously you cannot distribute that which is not produced. Such an extended upward trend in hourly wages could only be possible when there was increased productivity per man.

During the first three months of 1936, the number of wage earners had risen to 414,000. Whether this rapid increase can be maintained will depend upon the continued improved demand for our products. A recent study by the National Industrial Conference Board shows that as of Jan. 1, 1936, employment per unit of production was 113.9 per cent of the 1929 base. Of fourteen selected major industries, steel ranks second.

The steel industry has maintained its 56-yr. record of high individual yearly earnings per employee. During 1935 the average employee worked 34.2 hr. per week and received \$1,184. In spite of the fact that the policy of spreading work lowered the annual wages paid the average employee, we were still considerably above the average for all industries, which was \$1,087.

## Large Capital Expenditures

To those who preach the false economic philosophy of scarcity and would stop technological de-

velopment, on the theory that it would help employment, I point to the enormous capital expenditures made by the steel industry during the past seven years, and at the same time to the fact that while this took place wage rates went up and prices for our product came down. Employment was increased, the public secured a better and cheaper product, back-breaking jobs were eliminated and in the year 1935, approximately the same percentage of the sales dollar in the steel industry was still being distributed in payrolls. The iron and steel industry today has \$11,500 invested in buildings, tools and materials for every employee on the payrolls.

Today we are delivering sheets to specifications absolutely impossible to meet as recently as five years ago. More than that, prices have constantly receded since 1920. In 1920 our company received an average of \$135 per net ton for our products; in 1925, \$83; in 1930, \$68; and in 1935, \$54 per ton. Certainly no basic industry has ever made a better employment record in the face of such a period of drastic price readjustment.

While mechanization has brought about a total increase of employment in the industry, it has effected a marked decline in the number of so-called common labor jobs, and



C. R. HOOK

increased the number of employees in the higher skilled and higher paid groups. I can recall not so many years ago when approximately 30 per cent of the employees in our industry consisted of unskilled workmen. This has now declined to approximately 5 per cent, and the amount of grueling physical effort required by the average job has been greatly reduced.

As machines have relieved men of the burden of heavy, back-breaking work it is only logical that such generally improved working conditions should be accompanied by a substantial reduction in accidents. It is generally recognized that our industry pioneered in organized safety work in this country. Today every company with which I am acquainted conducts an organized program of accident prevention. I am thoroughly familiar with the record of one plant employing some 3100 men, where in the past quarter an efficiency of 99 per cent was reached, based on previously determined quality and production standards. At the same time there was a reduction of 65 per cent in accident frequency when compared with the same period last year. Safety and efficiency always go hand in hand. I do not hesitate to say that such a quality and production record could not have been

## Officers Reelected

**E. G. GRACE**, president, Bethlehem Steel Corp., was reelected president of the American Iron and Steel Institute for a term of one year. Mr. Grace has served one term as head of the Institute.

Other officers reelected were: **W. A. Irvin**, president, United States Steel Corp., and **T. M. Girdler**, chairman and president, Republic Steel Corp., vice-presidents; **H. L. Hughes**, vice-president, United States Steel Corp., treasurer; and **Walter S. Tower**, executive secretary.

made under any but the best possible working conditions.

#### Understanding Necessary

The great need today in every phase of our social, economic and political life is *understanding*. It always has been so, but today the need is even greater. We see tax legislation passed by the lower house of Congress which, if enacted into law, would in time ruin many corporations, large and small, and bring want and distress into the homes of thousands of workers. Certainly these legislators would not have been so unwise as to pass such an act if they understood the real facts.

If men are elected to high public office who do not understand the problems of corporate business, how increasingly imperative it becomes then for management to adopt ways and means of enlightening the man on the job and all others who are in any way dependent on industry, with respect to the fundamental economics, the

responsibilities, and the problems of business.

The enlightenment of the man on the job, to bring about better understanding, is, in my opinion, the only sound means of maintaining friendly relations between management and men which are lasting and mutually profitable.

It is just as essential that industrial management provide leadership and thought on social and economic problems as on industrial problems. We need courageous expression of opinion based upon what we know to be the facts. We can be persistent without being antagonistic. If we fail to provide this leadership it will come from some other source and then false social and economic doctrine will prevail. Management cannot assume that its acts and policies will be understood, endorsed, and supported even by those whose natural interests lie in the field of business without patient and persistent explanation and discussion.



W. S. TOWER

## Institute Activities

By W. S. Tower

DURING the year which has elapsed, since the code expired, members of the industry generally have continued to report to the Institute concerning employment, hours and wages. From those reports covering the vast majority of employees in the industry, it appears that members of the steel industry have done a good job in maintaining wages and hours in accordance with the announced intention. Outside confirmation of that fact is found in a study known as the Robert Report, made under Government auspices some months ago, to determine the degree to which members of important industries might be deviating from code provisions in respect to hours and wages. As regards the steel industry, the report states that the number of cases in which maximum hours had been exceeded was negligible, and that there were not any cases found in which there have been deviations from minimum wages. It has been a record of which the industry may well be proud.

In the matter of maintaining standards of fair competition as they had been described in the code, the performance seems not to have been so satisfactory. Within a comparatively few months after the code was terminated, rumors were

general in important steel consuming districts relative to undercover price concessions, secret rebates and other undesirable practices which it had been hoped the experience under the steel code had eliminated from this industry.

In the early part of this year, however, some members of the industry, realizing that rumors may be as destructive as realities, and knowing the inevitable consequences if such conditions continued, acted on the belief that at least a partial corrective might be found in putting their own commercial practices clearly in the open. They accordingly published lists of prices, discounts, allowances and other terms and conditions of sale of their respective products. That lead was followed progressively by other members of the industry until by this time, as recent inquiry indicates, almost every prominent producer in the industry has apparently adopted the practice of open publication of prices and other items bearing on its commercial transactions.

#### Statistical Work Carried On

Much of the new statistical work which was developed under the code has been continued in modified form. As a result, that part of the work of the Institute has been expanded and increased in usefulness

to members of the industry. Notable among the new records are those relating to income and earnings statements, with which recently have been reported and compiled figures covering payment of taxes. I think there will be general recognition of the importance to the industry of having such facts available for comparative purposes.

The technical committee, since the termination of the steel code, has been actively engaged in a program of work which embraces the following objectives:

To classify and define all commercial iron and steel products in so far as possible.

To study the possibility of limiting styles, sizes and designs of the principal steel products.

To formulate rules for standard methods of inspection of steel products.

To formulate a code of standard tolerances on all products.

As one step toward realizing the foregoing objectives and avoiding duplication of work already done by other agencies, the committee is collecting specifications of steel products that have been promulgated by societies or associations external to the industry. Those specifications are being carefully reviewed.

It is the hope and expectation  
(CONTINUED ON PAGE 61)



# Improvements in Production

## Heavy-Duty, 30-In., Universal Crankshaft Lathe

A HEAVY-DUTY, universal crankshaft lathe, adjustable for any throw up to 3½ in. (7-in. motor stroke) is announced by the R. K. Le Blond Machine Tool Co., Cincinnati. Indexing may be to any division for two, three, four, six or twelve positions. A change of tooling adapts the lathe to any crank within its range.

The bed features the company's improved compensating V on the front way, providing unusual carriage bearing surface. A combination of angles on the front guiding way provides a wide thrust bearing at right angles to tool pressure. The rear bearing is flat and the carriage is gibbed its entire length.

The roller back rest is guided, and has its movement on the rear of the carriage cross-slide. A handwheel on the front of the carriage moves the roller rest into position on the bridge; movement is through a feed nut on the bottom of the roller rest to a screw geared to the handwheel shaft.

Both the head and tailstock fixtures are driven together by means of a heavy splined shaft through the center of the bed to heavy duty face gears in both fixtures. A compensating coupling is provided on the drive shaft for realinement of head and tail fixtures in the event of driving gear wear because of hard and continuous service. The tail fixture is adjustable along the bed for varying lengths of cranks.

A rugged spindle has three-point support and is mounted in a heavy duty headstock. A large helical-face gear on the spindle is mounted between two Timken bearings, with

the end of the spindle floating lengthwise in SKF double roller spherical roller bearings. Counterweights to compensate for off balance weights of fixture and crank are mounted on both the head and tailstock spindles.

Drive from the variable speed motor is through V belts to a multiple disk clutch; a built-in disk brake provides instant stopping of the spindle upon clutch release.

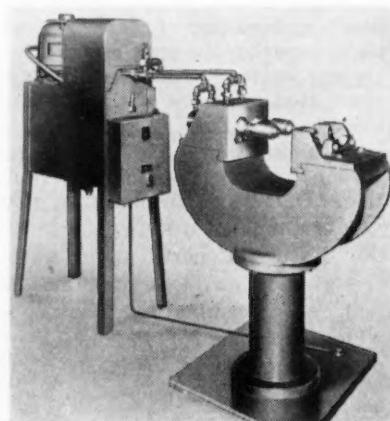
## Rapid Hydraulic Riveting Equipment

EIGHTEEN hundred rivets per hour is capacity for a new stationary riveter by the Hannifin Manufacturing Co., 621 South Kolmar Avenue, Chicago. Duplex hydraulic rams are actuated from a new hydraulic pressure generator unit equipped with automatic, electrically operated control valves. A special work holding gap fixture provides simple handling. Work control is by a single foot-switch button, which may be located at any convenient point.

Push button control actuates the pump unit and valves, the riveter cycle being completed automatically. The hydraulic ram cycle includes rapid advance stroke at moderate pressure until the die touches the rivet, automatic high pressure to head the rivet, reversal at peak pressure, rapid return stroke to starting position. The oil pump idles at zero pressure between cycles. The riveter ram develops 35,000 lb. pressure, ample

for heading  $\frac{3}{8}$ -in. cold rivets. Equal pressure is applied to head two rivets, regardless of length.

The hydraulic pressure generator unit, with automatic valves and control, is driven by a 2-hp. motor and occupies less than 4 sq. ft. of floor space.



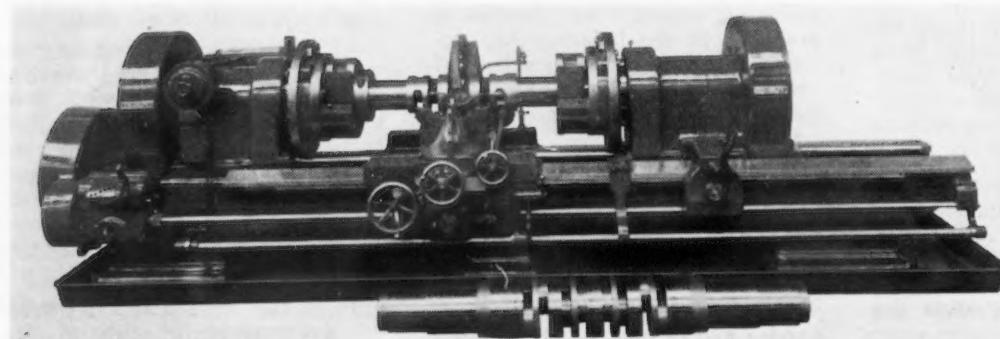
ABOVE

DUPLEX rams are actuated by a new hydraulic pressure generator in a rapid gap riveting equipment.

○ ○ ○

AT LEFT

A HEAVY splined shaft, through bed center, provides simultaneous drive to face gears on both head and tailstock lathe fixtures.



# on and Shop Equipment . . .



## Automatic Precision Thread Grinder Embodies Wide Work Range

**E**X-CELL-O AIRCRAFT & TOOL CORP., Detroit, announces a new universal precision thread grinder with capacity for grinding external threads 8 in. diameter, 24 in. long, on maximum length work pieces of 33 in. between centers. The machine is also adapted for grinding internal threads on work having threads not smaller than 1 in. diameter, 1 in. long, up to 8 in. diameter, 3 in. long. United States standard form; sharp "V," 29 deg. Acme, up to and including 60 deg. thread form, and modified Buttress threads with single, double, triple, quadruple or sextuple threads, within the range of pitches from one to 40 can be ground. Tapers up to two in. per ft. included angle can also be ground. A lead tolerance of 0.0002 in. per in. when grinding United States standard form threads can be maintained.

The machine is automatic in all operations except loading, unloading, and withdrawing the grinding

wheel at the end of a cut. It will grind to a predetermined size setting and then automatically stop feeding; or it may be set so that the table will stop at either end or at any point of its travel.

A variable high speed control is used to adjust the rapid approach speed of the work to the grinding wheel, in either direction of spindle rotation or table travel. Individual spindle speed adjustments are provided for each direction of table travel or spindle rotation, and are used as work speed adjustments for controlling the speed of the work while grinding. A lead compensating device corrects lead error caused by taper setting. A hydraulically controlled backlash compensating device for compensating the lead screw and gear backlash is also provided. A back-off attachment can be furnished with capacity up to 18 in. work length. A hydraulic wheel dresser is operated from the front.

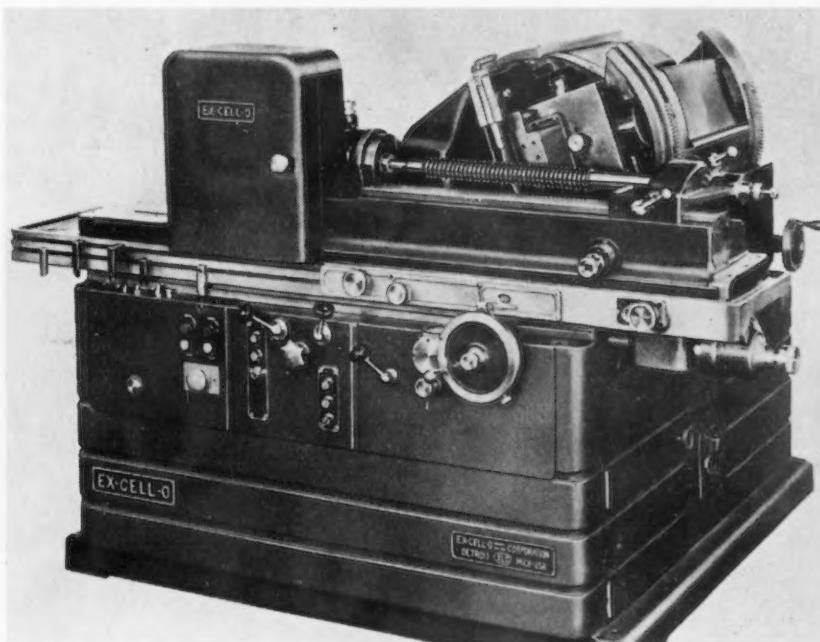
The grinding wheel spindle is equipped with Ex-Cell-O precision ball bearings. A three hp. totally enclosed ball bearing driving motor and wheel spindle are mounted in a cradle that can be adjusted so that the grinding wheel will grind up to 30 deg. to suit the helix angle of right-hand threads and up to 45 deg. for left-hand threads.

On a separate rubber cushioned base, located at the rear of the machine, are mounted the hydraulic pump, oil filter and drive motor. Coolant is furnished to the work by a vertical type centrifugal pump with direct connected electrical motor, mounted on the removable coolant tank located in the base and at the rear of the machine.

All controls are panel located on the front of the machine. Manual controls are also provided for use independently of the automatic controls.

## Heavy-Duty Coupling Avoids Metal Contact

**L**OVEJOY TOOL WORKS, 4979 Lake Street, Chicago, has announced a new L-R flexible coupling, type W. The coupling is classed as non-lubricated, heavy duty. Individual load cushions are free floating between metal jaws and rest upon a central hub, being secured in position by a spiral steel spring. Design permits large hubs and heavy load capacity. There is no metal-to-metal contact and no wear on jaws. Cushions can be interchanged without tearing down the coupling.



**A**LL machine movements of this precision thread grinder, except that of wheel withdrawal from work at end of stroke, are fully automatic.

## Interesting Shop Tool Production Service

**N**EW types of broaches and reamers made from Jessop Steel Co., Washington, Pa., "Mogul" molybdenum high-speed tool steel, are said to be establishing interesting service records. A tool bit is in service after chamfering ends of 75,000 screw machine parts. In another instance a bit is making  $\frac{1}{8}$ -in. cuts at a speed of 150 ft. per min., turning high-carbon spindles.

## Gear Speeder for Testing Quietness

**A** GEAR speeder, designed to closely simulate actual operating conditions in the testing of gears for quietness, is announced by Michigan Tool Co., Detroit. The machine is so designed that pairs of production gears can be run together both forwards and reverse, under load, while being checked. Each of the two spindles has its own drive and brake, all controlled through a single hand-wheel.

Revolving the handle in one direction a quarter turn applies the power to one spindle; another quarter turn applies the brake to the opposite spindle. Returning the hand-wheel to the neutral and continuing a quarter turn in the opposite direction applies the drive to the second spindle, while another quarter turn also applies the brake to spindle number one. Thus the condition of reversed loads, as in automobile transmissions, can be accurately obtained and gears checked for quietness under each condition in a single set-up.

The machine is designed to take gear clusters up to 14 in. in length on the rear and up to 17 in. in length on the front spindle. Center distances are adjustable from 2 $\frac{1}{2}$  to 5 $\frac{1}{4}$  in. maximum, permitting the testing of gears up to 8 $\frac{1}{2}$  in. in diameter. Both spindles are provided with a 1 $\frac{1}{2}$  in. hole to receive shanks of stem gears.

The machine also serves in the routine checking of gears in regular production, as an indicator against the introduction of varia-

tions during heat-treatment with different lots of gears or through errors in final finishing of gear

bore. The use of the equipment avoids individual checks on production gears for eccentricity, involute, helix angle, spacing, etc., but will designate a run of noisy gears which may require added inspection to determine the cause of noisiness.

## Special Press Welder for Shipbuilding Work

**R**ESISTANCE welding equipment, by Thomson-Gibb Electric Welding Co., Lynn, Mass., and in operation at one of the larger Navy yards, is designed to weld two thicknesses of 3/16-in. corrosion resisting steel plates at a production speed of 30 to 40 spots per min.

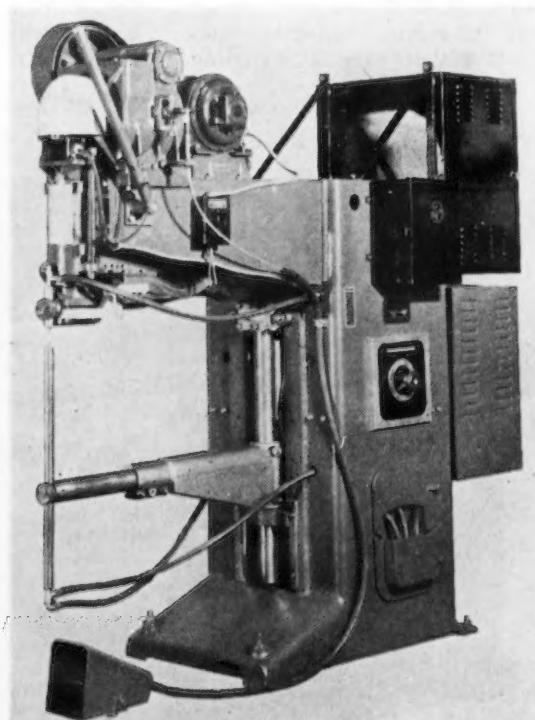
A special split-type head is equipped with a hand lever for locating the upper electrode accurately before the power driven, mechanically operated pressure device goes into action. The design also provides for making spot welds on somewhat lighter material through manual operation of the upper head. A hand lever push button gives single hand control of both pressure and current.

The lower arm is adjustable through a range of 24 in. A 150

kva. capacity welding transformer, an auto transformer and two seven-point regulator switches, in combination, provide 49 points of welding voltage and current regulation and an automatically adjustable timing device.

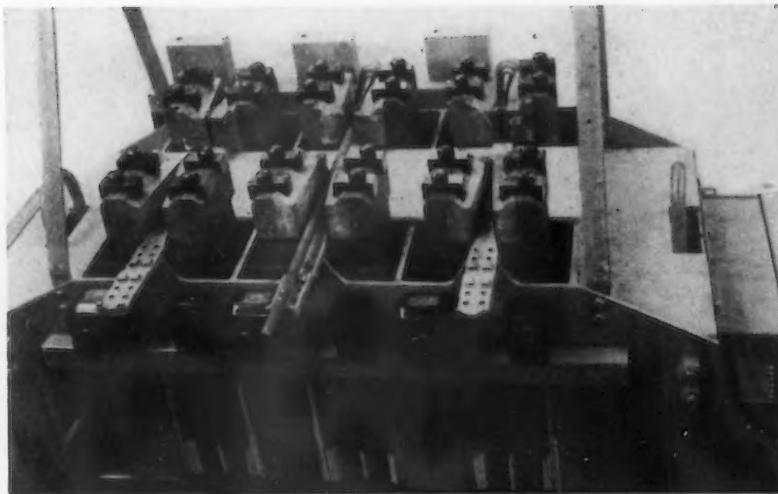
## Hand and Machine Hacksaw Blades

**N**U-MOL, a new hacksaw blade development by Henry Disston & Sons, Inc., Philadelphia, is announced, in both hand and machine blades, for work which requires the withstanding of steady abuse, such as small stock, stacked and bundled.



**A** SPLIT-TYPE head, employed with this special welding equipment, has a hand-lever mechanism for accurately locating the upper electrode, prior to power operated mechanical pressure device action.

**N**EW heating equipment for end forging work utilizes electric eye control for temperatures and electric clock control for regulating length of soak.



**A**N L-type forging work heater, equipped with a three electrode unit, is illustrated above. Electric eye control is employed.

• • •

times the diameter of the piece can be obtained. Temperature is controlled by an electric eye. In addition, an electric clock is provided to permit a soaking period if desired. The unit is used principally for heating the ends of material for hardening or tempering purposes, as well as for certain kinds of upset work.

The company has also brought out a type L heater, equipped with electric eye control of temperature. A three-electrode unit is illustrated. A prominent motor car manufacturer employs seven of these on drag-links. Capacity,  $5/16$  to  $2\frac{1}{2}$  in. diameter, and 1 to 24 in. length of heat at end or on any section of bar or flat stock.

## Horizontal Heater for End Forging Work

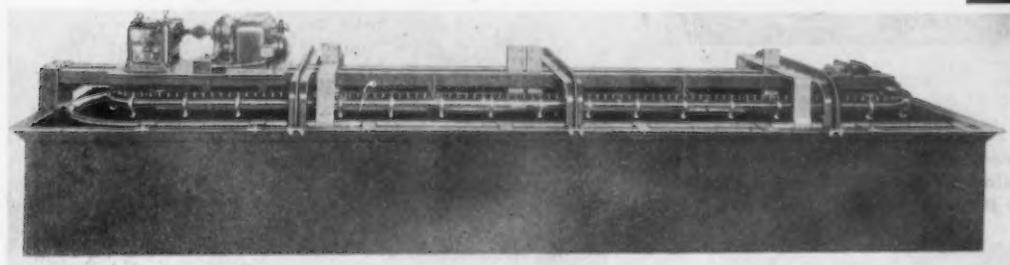
**T**HE American Car & Foundry Co. announces a new Berwick type C horizontal forging heater for developing required heat on the

end of any material ranging  $\frac{1}{4}$  to 1 in. or more in diameter. The work is placed between the electrodes and a heat one and a half

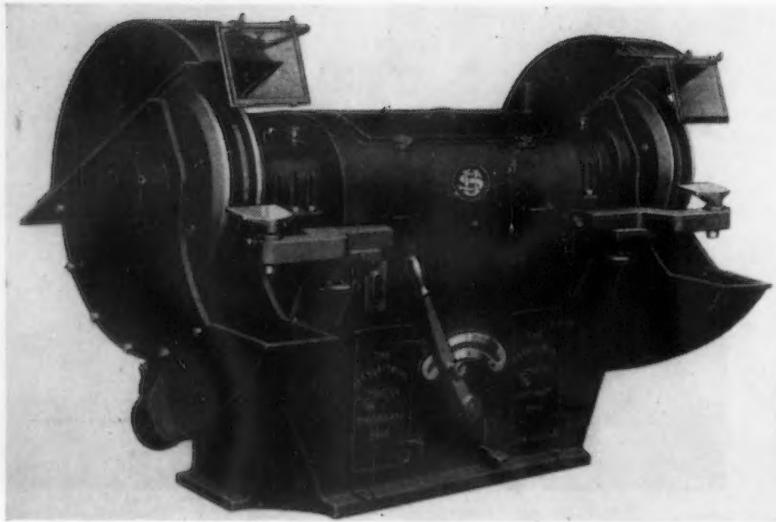
## Plating Equipment Has New Features

**N**EW plating equipment by the Udylite Co., Detroit, features a strong structural steel chassis, a simplified chain hook combination, an alloy steel chain with breaking strength exceeding five tons and cut tooth drive sprockets. The

equipment is built in a wide variety of sizes. The work racks are hung on the chain conveyor and are carried away from and brought to the operator at any desired chain speed between 1 and 4 ft. per min.



**N**EW semi-automatic equipment subjects each work piece to controlled identical plating conditions. Work racks (above) attach to a variable speed conveyor chain.



## Wheel Adjustment Compensates Grinding Wear

A NEW adjustable speed, alternating current floor grinder, Model 65, by the United States Electrical Tool Co., Cincinnati, is equipped with a patented gear-drive transmission providing four-wheel speeds through a single gear-shift lever. The range of speed thus

provided permits change to correct wheel surface speed as wheels wear down to flanges. Maximum surface speed is 5500 ft. per min. with vitrified wheels, and 9500 with high-speed wheels. A wide range of sizes is built in 3 hp. up to 12 in., and 15 hp. up to 30 in.

grooved pulley or on a 5-grooved pulley. The main drive is by motor or countershaft by V-ropes to the main driving shaft, and the three spindle speeds are obtained by changing the V-pulleys. Push button operating control is provided. Drive to cam shaft is by spiral gears on the main driving shaft into a feed box and through pick-off gears to a shaft at the rear of the machine, on which is fitted a two-step V-pulley, and then to an intermediate shaft fitted with a 5-step V-pulley; and lastly to a worm and worm wheel on the cam shaft. The machine is designated as the Wickman 10 mm. high speed automatic.

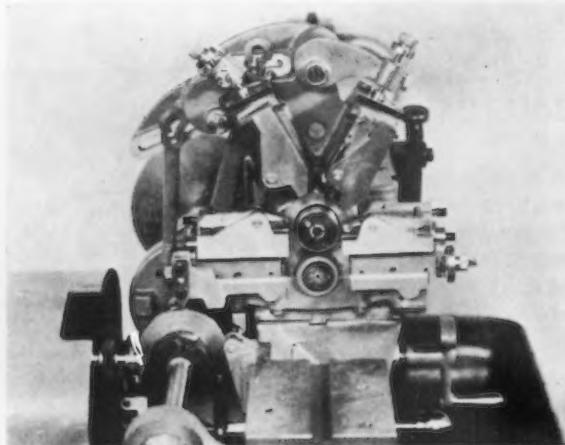
## Light Tension Belting

A JUNIOR size "Beltpaco" transmission belt is announced by the New York Belting & Packing Co., 1 Market Street, Passaic, N. J. Extra plies and narrow construction provide utility for light tensions, small pulleys and bearings, drives for small machine tools or for auxiliary unit drives, and special light conveyors.

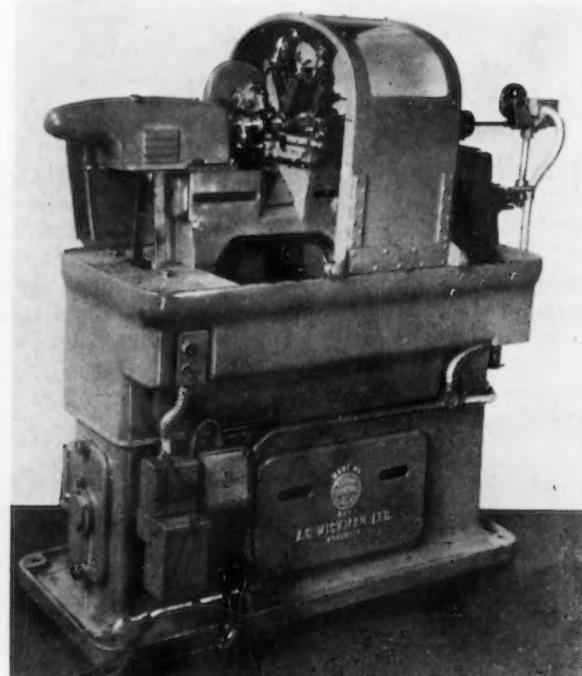
## Small Automatic Screw Machines

IN THE design of a new British made automatic screw machine for small work, A. C. Wickman Ltd., Coventry, England, call attention to simplicity of camming. Standard machines have three pri-

mary spindle speeds for each of which there are 117 changes of feed ranging from 0.55 sec. minimum to 4 min. 6 sec. Changes in feed cycle are obtained either by pick-off gears, a V-belt on a twin-



COMPACT tooling by means of four tool slides is said to permit tool work at the collet face with a new English high speed automatic screw machine. Micrometer setting is provided for each tool.



## Small Portable Drills

A LINE of three portable drills, in the low-priced class, have been added to the Skilsaw, 3310 Elston Avenue, Chicago, line. Model designation is "Defender," capacity is rated at  $\frac{1}{4}$  in., and light weight is maintained.

## Light-Weight Self-Rotated Stopehamers

**P**NEUMATIC rotation, without pawls, plunger springs, or ratchets, features a new stopehamer by Ingersoll-Rand Co., Phillipsburg, N. J.

Reciprocating motion is imparted to the rifle bar by the movement of a piston, assisted by air pressure applied alternately to the faces of the rifle bar head.



When the piston moves forward, the teeth of the rifle bar are lifted out of engagement, and the bar is rotated freely. When the piston reverses, the teeth are forced back into engagement in an advanced position. The returning piston is rotated by helical flutes of the locked rifle bar, causing the steel to rotate.

The rifle bar teeth can be held out of engagement by air pressure controlled by a throttle valve; thus hammer action without rotation is available for collaring a hole.

An improved rotating handle is short and contains the lubricator and air-feed release, having a poppet valve with a removable bushing. The lubricator can be filled with the stoper in a vertical position. A molded rubber bushing around the steel, seals working parts against cuttings and is solidly held.

## Limit Switch Features Compactness

**T**HE Production Instrument Co., 1325 South Wabash Avenue, Chicago, is manufacturing a new compact, quick-acting switch for sensitive control of electrical cir-



cuits. Housed in a molded bakelite case, this type ES-9 unit measures  $1\frac{1}{8} \times 1\frac{1}{8} \times \frac{1}{8}$  in. and weighs one ounce. The operating arm is 1 in.

long and the operating shaft projects  $\frac{1}{2}$  in. from the case. A pressure of  $\frac{1}{2}$  oz. on the operating arm is sufficient to operate the switch.

Phosphor bronze spring, coin silver contacts, and bronze shaft bearing are features. Utility covers right or left-hand operation, open or closed circuit, with reciprocal or rotary motion, and with

any position of the lever arm. The make-and-break position can be accurately adjusted. Specified adaptations are in connection with electric counters and recorders, for signaling operations of many kinds, as a limit switch, for controlling motor operation, for lighting and other electrical circuits in alarm systems, in a wide variety of automatic controls and synchronizing operations. The illustration is actual size.

## Special Radio Tube Marking Equipment

**A**SPECIAL machine for the automatic marking of radio tubes is announced by Noble & Westbrook Mfg. Co., East Hartford, Conn. Designated as No. 24,

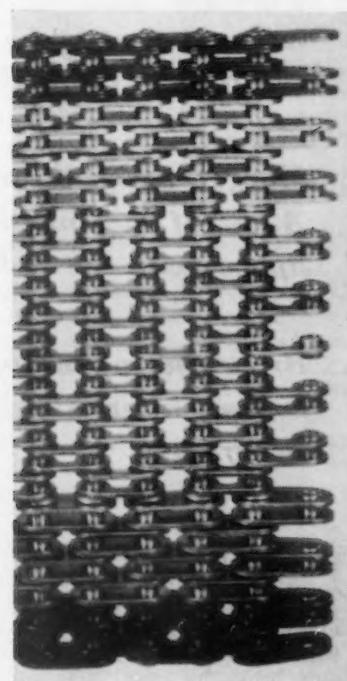


power operated marking machine, the design is applicable to many thin walled hollow parts. Work pieces are mounted on pin-mandrels which are carried on a revolving dial. The mandrels act as metal supports during marking operations. Mandrel loading is by hand; ejection is automatic.

Federal income taxes, which reflect the earnings of the steel industry, almost disappeared from 1931 until last year. In 1935, when for the first time since 1930 the industry showed a profit, a total of \$15,387,089 was paid in taxes to the Federal Government. This was about 57 per cent below the 1929 Federal taxes of \$36,162,904. In 1935 net earnings were 83 per cent under those for 1929.

## Standard Silent Chain Conveyor Belts

**T**HE Whitney Chain & Mfg. Co., Hartford, Conn., announce a new type of conveyor chain which has been developed particularly for the glass manufacturing industry, but which is said to offer advantages in other work requiring a smooth metallic belt with an open mesh which will permit of free blast flow. Each application is built up of standard units to any desired width. Silent chain link



**A**CONTINUOUSLY smooth carrying surface features this built-up chain belt for conveyor use.

driving units are assembled in the center section of the conveyor. Driving sprocket teeth are cut with standard silent chain cutters, insuring a smooth drive, and uniform height.



# THIS WEEK ON THE ASSEMBLY LINE



*... Sales allowed to overtake production as automobile makers face task of estimating dealer inventories required during summer changeover period.*

• • •

*... Chrysler seen as only important automotive buyer that will take steel ahead for 1937 models in order to reap advantage of present prices.*

• • •

*... Merger plans of independent unions with the A. F. of L. United Auto Workers are moving apace, with the M.E.S.A. holding back.*

• • •

*... Broaching of top and bottom of cylinder block is most interesting development of new tooling programs.*

DETROIT, June 2.—Production has again shown a slight decline from the previous week, although not nearly at the same rate as took place the week before when volume broke by over 7300 units, largely due to the Ford Motor Co. going on a 4-day week basis. Cram's reports estimate 108,346 units for the week ended May 30, as against 109,821 the week before and 65,675 for the corresponding week a year ago. The drop of 1500 units from the past week is largely attributed to a decline in output of the independents as well as a reduction in Plymouth schedules. Chevrolet will work four days this week, although it will continue to maintain its

high daily output of approximately 6300 units. Ford's daily output has dropped from 5200 to 4750 units, and it is understood that tentative schedules for the 30-day period ending June 20 call for 87,500 units, while for the following period ending July 20, 68,000 units are scheduled. Dodge's daily output has remained unchanged for a number of weeks at 1262 units.

It is more than obvious that the peak in production has passed, but the let-up thus far is slight compared with the drop that was taking place at this time a year ago. While sales continue at high levels, the volume of domestic sales has not yet overtaken in any month

since November the volume of production for domestic delivery. In order that sales and production may balance for the 12-month period, it is necessary that these two curves cross. Dealer stocks of cars in the lower-priced classes are high at the present time in the Detroit area, and this factor no doubt is the greatest one in dictating the application of brakes to the exceedingly high output that the manufacturers have been enjoying during the past two months.

Total production of passenger cars and trucks for the United States and Canada has been officially placed at 527,726 units for April by the Department of Commerce. Estimates of May production are only slightly lower. June should see well over 400,000 cars produced, but the real dip will take place in July. Already there is talk of seasonal shut-downs due to model changes beginning as early as July 10 or as late as Aug. 15. Because of the very large change-overs involved, particularly in mechanical components, these change-over periods will run as high as five to six weeks.

Sales of cars in the medium-priced classes are holding up surprisingly well. Buick reports a gain of 13 per cent in sales during the second ten days of May over the first ten days and 142 per cent over the corresponding period of May, 1935. In fact, the volume is greater than for any similar period since 1928. Buick has already sold over 100,000 cars of the 1936 model, and it is expected that by the end of the 1936 model season the company will have produced and sold close to 170,000 units, practically duplicating the 1929 volume. Studebaker sales for the first twenty days of May were 63 per

By FRANK J. OLIVER  
*Detroit Editor, The Iron Age*



cent over the corresponding period of 1935.

On May 26, the three millionth Ford V-8 came off the assembly line in the Rouge plant. This makes the one millionth Ford to be built since June 13, 1935, a year less 18 days. Since the Ford Motor Co. was established June 16, 1903, more than 24,000,000 Fords have been built. It is expected that the 25,000,000th Ford will come off the assembly line early in 1937. It is estimated that by the close of the 1936 model season one million Ford V-8s will have been made of that particular model. Incidentally, in its balance sheet placed on record at Boston last week the Ford Motor Co. has an indicated 1935 profit of \$3,565,617, or \$1.03 a share. This compares with an indicated profit of \$6,860,462 in 1934. Reserves increased during the year from \$10,096,989 to \$10,961,346. The figures do not take into account any dividends that may have been paid to Henry Ford, Mrs. Henry Ford and Edsel B. Ford, the sole stockholders. These figures give little clews to the actual operating picture of the company, since it is quite possible that the huge expenditures for plant rehabilitation and improvement in the last year have been charged to current expenses.

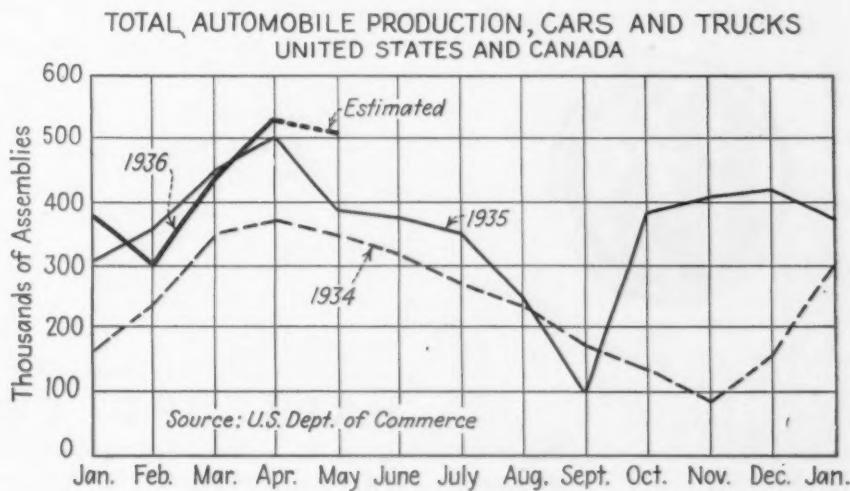
#### Steel Price Rise Reaction

With but few exceptions, the large automotive buyers are taking rather philosophically the recent announcement of third-quarter price changes in steel. After producing first-quarter earnings that broke all records, the automobile companies can hardly assume a "dog in the manger" attitude and tell the steel producers that they must continue to drag along with

meager profits while their chief customer makes up to 30 per cent on its capital investment. Although some dissatisfaction has been expressed as to the firm price policy adopted by the industry in the second quarter and being continued into the third with the new price schedules, many buyers are at least assuring themselves that they are purchasing at as favorable a price as any of their competitors are able to do. With the demoralized situation that was present during the past fall and winter, a buyer never could be sure as to whether he was getting the best price, or whether some other buyer was not getting a greater price concession. There are some who believe that the present firm price cannot be maintained in the face of the tremendous pressure that the automobile manufacturers are able to bring to bear on their principal suppliers. There is every indication, however, that an extremely strong front against any price cutting tactics is being taken by the mills. In the majority of instances

the automotive buyers are congratulating them on their firm stand.

Boosting of prices in the third quarter appears to be good strategy, as far as selling to the automobile manufacturers is concerned. While at first sight it might appear short-sighted to raise prices at a time when steel specifications are beginning to drop off drastically, actually it will work to the advantage of the mills, with but one possible exception, that there will be very little coverage of specifications for future assemblies before the first of July, the deadline of deliveries under the present set-up. This will mean that 1937 model requirements will largely be bought at new prices. Steel for 1936 models has largely been contracted for, and most orders to be placed in June will be to balance stocks and to take care of revised schedules as the season end approaches. In view of Chrysler's action in building up large inventories just before the Steel Code went into effect, it is not un-





This is the Pratt & Whitney final inspection room for gages, kept at constant standard temperature.

*confidence . . .*

*"In the future it will not be necessary to check Pratt & Whitney Thread Gages"*

The chief inspector of a large manufacturing plant issued that instruction recently to his men. Years of experience with P&W Thread Gages inspired this complete confidence. It had always been their practice to inspect minutely every gage purchased before it was put to work.

Each Pratt & Whitney gage goes thru a rigid inquisition before it can be shipped to a customer. Our gage final inspection room, pictured above, is really a part of *your* plant, guarding *your* product. Regard it that way. You can be sure that Pratt & Whitney Gages which have passed thru this room are accurate, the best that can be made.

Have you a copy of our Gage Catalog?



**PRATT & WHITNEY DIVISION**

Niles-Bement-Pond Company

**HARTFORD, CONN., U. S. A.**

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likely that this corporation will again enter the market in a fairly big way so as to provide itself with raw materials for 1937 models under the present price structure. Of all the large producers, Chrysler seems to be the only one that has definitely committed itself thus far as to width and gage requirements on sheets for next year's bodies and on other steel categories entering the car. The summer months offer, perhaps, the best period of the year when steel stocks may safely be stored out-of-doors without encountering too much damage from the weather. It is expected, however, that should Chrysler adopt such a policy, it will not commit itself for more than initial production, say a month's requirements on 1937 models. All this is surmise at the present writing, since the price announcements have hardly been out long enough for the principal car makers to formulate a definite policy and put it into effect.

#### Labor Groups to Consolidate

As was anticipated in these columns a few weeks ago, one of the first moves of the reorganized United Automobile Workers Union has been to attempt to draw into its group several of the independent unions operating within the Detroit area. Last week merger votes were taken. Eighty per cent of the members of the Hudson local of the Associated Automobile Workers of America favored merging with the A. F. of L. unit, and a committee was appointed to make merger plans. The central assembly of the Automotive Industrial Workers Assn., made up of delegates from 26 locals, voted unanimously for the merger. This is

the group backed by Father Coughlin, at least through moral support, and is scattered mostly through various units of the Chrysler Corp.

Merger invitations coming from the U.A.W. are sowing further seeds of dissension among the Mechanics Educational Society of America, which has been suffering from internal discord for some time. Several locals of the M.E.S.A. have indicated a rather favorable attitude. Other groups are definitely antagonistic, as is the general secretary, Matthew Smith. A statement made by one of the local organizers to the effect that the group was throwing out disruptive members of the Communist party who had attempted to use M.E.S.A. meetings for their own propaganda, and that some of these Communists are voluntarily joining the U.A.W., has been attributed as an effort to discredit the A. F. of L. units, and thus block the merger. Incidentally, in this connection the M.E.S.A. formally announced that as far as its own organization was concerned, the strike was over at the Motor Products Corp., and that the men could separately negotiate with the management for their return to work. As far as the company is concerned, this strike died a natural death months ago, owing to failure of the several locals involved to get together in any united effort. With the present production season beginning to taper off, these men haven't a ghost of a show of getting their jobs back. The experience should have been enlightening for them, as far as organized labor methods are concerned.

With Fisher Body definitely com-

mitted to the all-steel body next year, it is interesting to learn that dies are now being constructed to make the new steel top roof of the 1937 Ford. Hudson is carrying the all-steel idea a step further and recently announced that it had adopted all-metal tube radios for its cars, the first company to do so in automobile installations.

There has been a great deal of talk of automatic transmissions and over-drives during the past few months. Chief names mentioned are General Motors units, and it is understood that several of them are about set on torque converting types. The most likely candidate for a unit of this kind is the Oldsmobile.

In these New Deal days there is much talk about the machine replacing man power. Certainly the automotive industry has been the leader in lowering costs by improved machinery that tends to raise output, reduce floor space and machine tenders on particular operations. Occasionally one hears of a move that seems to be a step in the opposite direction. During the past few months, for example, the Ford Motor Co. has been converting its pistons from aluminum to alloy steel. While the reason for the move seems to be largely to obtain a coefficient of expansion of the metal that is comparable with that of the block, it is hard to see how manufacturing costs could be lowered. Aluminum can be machined up to 1500 ft. per min. This particular grade of alloy steel can be cut at approximately 100 ft. per min., which means that the machining time is greatly increased, not exactly in the ratio

(CONTINUED ON PAGE 102)

• • •  
**PRACTISING** what they have been preaching. Chas. F. Kettering turns the first spadeful on a \$1,000,000 addition to the General Motors Research Laboratories. Interested onlookers are (left to right): T. S. Merrill, secretary, and M. D. Prentis, treasurer, General Motors; D. C. McGuire, president, Argonaut (G. M.) Realty Corp.; E. F. Fisher, general manager, Fisher Body Div.; L. P. Fisher, C. E. Wilson and O. E. Hunt, vice-presidents of General Motors.



# Minimizing the Hazards Of Maintenance

(CONTINUED FROM PAGE 47)

The open-hearth superintendent was frank enough to agree with us when he later saw the danger involved upon lowering the cold ladle from its precarious position.

When the nature of the work is known, the necessity of properly planning the methods of approach and the proper equipment to be used on the job are most essential to the satisfactory accomplishment of the work at hand with the least danger to the men employed on the job. Hastily improvised rigging, inadequate slings, unsafe ladders and improper tools all involve potential failure and hazard to men on the job or adjacent to the location where such a failure may take place.

The impulse to use whatever equipment readily comes to hand is uppermost in the minds of the repairmen when they are working against a delay, and the number of times they get away with it in such instances makes the insistence on safe methods appear as an interference with fast maintenance. The answer is to provide proper equipment readily available so that men will prefer to work safely rather than otherwise.

It is readily understandable that what constitutes a hazard for one type of man may actually be relatively safe for the properly trained and skillful workman, familiar with the risks and conditions surrounding the particular type of work.

Therefore, it is extremely important that only such men be assigned to given classes of repair work. This is particularly true in connection with repair work involving electrical hazards in addition to those normally present, were such a job purely mechanical.

I consider the repairing of overhead cranes possibly the most hazardous class of work for the reason stated namely, the ever-present danger of shock to men working in the air and the resultant reaction from such a shock, causing the man to lose control of himself momentarily and possibly fall. The crane repairman, therefore, must be mechanically and

electrically qualified to do the work assigned in addition to being what we know as a "safe man in the air," which means a careful and sure climber and safe rigger.

Rating crane repairs in first place will probably be questioned by many who will say the high tension line construction and repair work should be given first rating from a standpoint of the hazard involved. The answer to this question is that as a general rule the work on high tension lines is so carefully studied and the men are protected by unusual safeguards, safety practice, and planned procedure that the opportunity of an accident other than falling is quite remote, in fact, I would be inclined to give second place as regards hazards to maintenance work that must be carried on in the presence of a gaseous atmosphere wherein the faculties and alertness of the men may become gradually lowered without a full realization of the extent being known.

All of this is so intimately connected with the necessity of selecting properly qualified men for these normally hazardous classes of work that we continually stress this point with our leaders.

The other vital consideration is the proper instruction of men, particularly the newer employees or men going on a new type of work, regarding the proper methods of doing the work assigned in a safe manner, not to scare them, but to definitely acquaint them with the possible dangers involved and how to avoid them.

The further responsibility of the foreman involved in the selection of the proper type of men is the elimination of the careless and dangerous worker, the man who will take chances and may by so doing endanger others, the man who cannot be told, the "wise guy," in short anyone who cannot or will not think safely. Such a man is an unnecessary hazard on any kind of work—we have all seen the type. He may be and in fact quite often is quite capable from some standpoint, but, nevertheless, he spells

danger and when such a man is laid off he invariably blames his superiors and never himself.

Real safety thought is given to the protection of equipment from the standpoint of operation and the operator, and it is essential that the same consideration be given the maintenance man while making his repairs, which oftentimes involves hazards infinitely greater than are experienced in normal operation. Here again we must pause to consider that some men may be relatively safe under conditions that would be dangerous to other, less skilled workmen. Nevertheless, we are now making every effort to minimize the hazard of maintenance by studying all features of repair work from the safety standpoint and the result has been and will be greater use of repair platforms, guarded ladders or steps, isolation of power circuits, provision of safety barriers that can readily be placed between the repairmen and dangerous exposed parts, the locking out or tagging of main switches or disconnects, and the adoption of other safeguards that will make for safety of maintenance. The provision of adequate illumination of a maintenance job is of primary importance as a safety measure.

In connection with new equipment there is no excuse for neglecting safety, but in the reconditioning of old equipment we must be especially interested in adding such safeguards as are possible and practical in order that we are not guilty of creating a new hazard in trying to eliminate an old one.

It is true that we will continually be confronted with the undoubtedly correct statement that safeguards are by no means the entire answer and we unhesitatingly agree on this point, but safeguards not only help to protect but they also serve as an object lesson to help drive home to our men the thought that we are back of safety with our money and want them to think along safe lines.

In conclusion let me stress again the fact that it is the attitude toward safety of those in charge of an operation that will do more than any one thing to help put it across to the workmen. If leaders weaken to any degree, the effect will be immediately reflected in the reduced efforts of those down the line.

## Institute Activities

(CONCLUDED FROM PAGE 49)

that out of this work of the technical committee there may come a series of standard definitions which can be accepted and used by all members of the industry, and a set of simplified and universally approved specifications.

### Tariff Committee Busy

The tariff committee has continued to watch the progress of negotiations of reciprocal trade agreements which have a bearing on import and export activities of steel products, and by cooperation with the staff of the institute have tried to keep members of the industry fully informed as to developments in those fields. Also, in some important cases which have been before the customs court, the institute, with the help of several members of the technical committee has been able to offer the court substantial assistance in the matter of getting correct classification of foreign merchandise coming into this country, in order that the provisions of the tariff act might not be evaded by incorrect description and classification.

One of the principal activities of the committee on industrial relations and the industrial relations division of the institute has been the holding of district meetings at convenient places with representatives of the various steel companies. In the course of the year a total of more than 120 companies have participated in the discussions at those meetings. The range of subjects considered at those meetings has been very varied, prominent among which the following may be noted:

Reviewing the labor statistics reported by the steel industry, with special reference to performance in maintaining maximum hours and minimum wages.

The provisions of various pieces of proposed Federal legislation which would affect conditions of employment, such as the so-called Government contracts bill.

The problems presented by existing and proposed Federal and State legislation relative to unemployment insurance and social security.

The progress of industrial relations work being done in the steel industry by different members,

and the possibilities of further progress in that field.

At the same time, the industrial relations division of the institute has undertaken to keep members of the industry informed of developments of interest to them by distributing reports, pamphlets and other classes of published matter, both of general and of special interest.

### Public Kept Informed

During the past year the publicity division has continued its work of providing information relative to many phases of the steel industry to the press and the public. A major part of the information disseminated by the institute has gone out to the public through the publication *Steel Facts*. There now have been 13 issues of that publication since the first issue appeared eighteen months ago. The total circulation of the 13 issues has approximated one million copies.

This publication also has directed the attention of the press and of writers throughout the country to the fact that this institute is a source of authentic information relating to the steel industry and that such information is readily available to anyone interested.

As a result, the publicity division is continually being called upon for facts bearing upon the industry by writers for newspapers and magazines. Loose statements and misinformation appearing in print with respect to the steel industry are no longer excusable, it is our general policy not to let them go unchallenged, and it is our impression that they are becoming less common than they were in the past.

*Steel Facts* has also won a wide and growing recognition from the general public. Each issue is followed by many requests from individuals who wish to receive it regularly, and it appears from the hundreds of newspaper items and editorials making use of information presented in *Steel Facts*, that it has served a real purpose in presenting to the general reading public useful and accurate information about this industry.

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THE unromantic bolt and nut came into their own recently by winning second place in a beauty contest. The All-America Package Competition in New York, which judges thousands of packages designed by leading artists and package design engineers annually, selected a new package for bolts and nuts, developed by Lamson & Sessions Co., Cleveland, as winner of the second highest award.

The new carton, which marks the first package change in the bolt industry for 75 years, according to Lamson & Sessions executives, won by virtue of the pattern of bolts, nuts, cotter pins, rope clips, plow bolts, semi-finished and castellated nuts, stove bolts, etc. which is printed all over the carton. Copyright notices appear conspicuously here and there on the carton, and patents are applied for by the company, the all-over design serving as a trade-mark for the line of products of this manufacturer. The new style package is now being supplied jobbers.



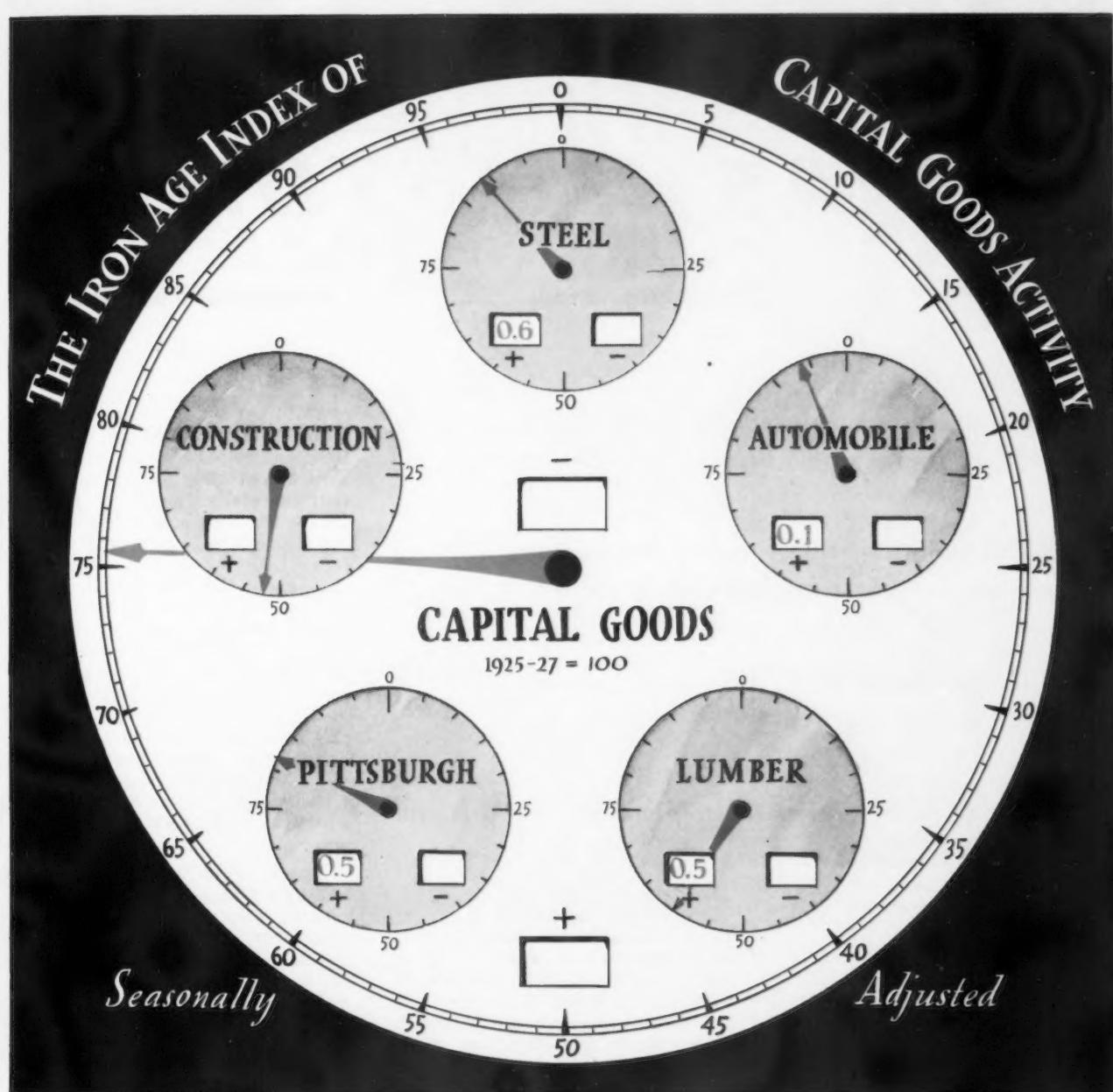
# Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available.

	April, 1936	March, 1936	April, 1935	Four Months, 1935	Four Months, 1936
<b>Raw Materials:</b>					
Lake ore consumption (gross tons) <sup>a</sup> .....	3,485,293	2,897,867	2,360,002	9,690,650	11,967,034
Coke production (net tons) <sup>b</sup> .....	3,554,617	3,366,665	2,736,723	11,512,399	13,665,166
<b>Pig Iron:</b>					
Pig iron output—monthly (gross tons) <sup>c</sup> .....	2,403,683	2,040,311	1,663,475	6,519,391	8,293,585
Pig iron output—daily (gross tons) <sup>c</sup> .....	80,125	65,816	55,449	54,328	68,542
<b>Castings:</b>					
Malleable castings—production (net tons) <sup>d</sup> .....	.....	45,378	42,035	169,620	.....
Malleable castings—orders (net tons) <sup>d</sup> .....	.....	47,844	37,394	163,424	.....
Steel castings—production (net tons) <sup>d</sup> .....	.....	51,674	31,952	122,614	.....
Steel castings—orders (net tons) <sup>d</sup> .....	.....	71,341	28,233	123,030	.....
<b>Steel Ingots:</b>					
Steel ingot production—monthly (gross tons) <sup>e</sup> .....	3,942,254	3,342,619	2,640,602	11,150,326	13,295,237
Steel ingot production—daily (gross tons) <sup>e</sup> ....	151,625	128,562	101,562	108,256	127,839
Steel ingot production—per cent of capacity <sup>e</sup> ..	69.09	58.58	45.88	48.9	58.25
<b>Finished Steel:</b>					
Trackwork shipments (net tons) <sup>f</sup> .....	7,031	6,258	4,472	13,137	20,771
Steel rail orders (gross tons) <sup>f</sup> .....	150,057	62,300	14,000	224,592	574,348
Sheet steel sales (net tons) <sup>f</sup> .....	190,269	251,818	168,093	866,303	755,136
Sheet steel production (net tons) <sup>f</sup> .....	217,975	207,820	209,219	891,077	840,154
Fabricated shape orders (net tons) <sup>f</sup> .....	101,614	104,868	95,380	337,852	462,912
Fabricated shape shipments (net tons) <sup>f</sup> .....	124,044	102,478	85,629	328,915	377,319
Fabricated plate orders (net tons) <sup>f</sup> .....	.....	29,787	13,244	63,918	.....
Reinforcing bar awards (net tons) <sup>f</sup> .....	26,700	24,025	30,490	87,840	142,365
U. S. Steel Corp. shipments (tons) <sup>f</sup> .....	979,907	783,552	591,728	2,376,976	3,161,188
Ohio River steel shipments (net tons) <sup>f</sup> .....	74,110	116,510	57,825	249,922	270,162
<b>Fabricated Products:</b>					
Automobile production, U. S. and Canada <sup>g</sup> ....	527,726	438,945	501,812	1,610,753	1,644,851
Construction contracts, 37 Eastern States <sup>h</sup> ....	\$234,806,300	\$198,978,300	\$124,020,000	\$421,781,500	\$780,627,600
Steel barrel shipments (number) <sup>i</sup> .....	730,099	648,165	610,848	1,977,132	2,422,608
Steel furniture shipments (dollars) <sup>i</sup> .....	.....	\$1,585,800	\$1,122,987	\$4,547,236	.....
Steel boiler orders (sq. ft.) <sup>i</sup> .....	783,961	589,676	315,562	1,638,134	2,807,388
Locomotive orders (number) <sup>i</sup> .....	15	13	2	11	88
Freight car orders (number) <sup>i</sup> .....	3,650	627	600	1,430	12,557
Machine tool index <sup>i</sup> .....	125.7	105.3	65.6	†60.3	114.4
Foundry equipment index <sup>i</sup> .....	134.0	115.0	113.2	†86.0	119.8
<b>Foreign Trade:</b>					
Total iron and steel imports (gross tons) <sup>j</sup> .....	49,277	56,720	28,866	101,964	199,844
Imports of pig iron (gross tons) <sup>j</sup> .....	11,982	23,743	8,247	23,729	65,418
Imports of all rolled steel (gross tons) <sup>j</sup> .....	.....	22,046	13,566	54,355	.....
Total iron and steel exports (gross tons) <sup>j</sup> .....	301,987	264,337	205,336	1,019,648	1,021,690
Exports of all rolled steel (gross tons) <sup>j</sup> .....	98,678	92,606	64,625	283,833	336,397
Exports of finished steel (gross tons) <sup>j</sup> .....	96,145	86,676	54,034	247,850	319,463
Exports of scrap (gross tons) <sup>j</sup> .....	196,906	163,295	131,731	691,419	356,272
<b>British Production:</b>					
British pig iron production (gross tons) <sup>k</sup> .....	629,800	633,600	526,300	2,084,800	2,444,000
British steel ingot production (gross tons) <sup>k</sup> ....	991,500	980,100	808,700	3,177,900	3,822,600
<b>Non-Ferrous Metals:</b>					
Lead production (net tons) <sup>l</sup> .....	38,073	35,150	32,389	122,119	143,646
Lead shipments (net tons) <sup>l</sup> .....	40,457	36,743	40,922	136,113	144,876
Zinc production (net tons) <sup>l</sup> .....	43,252	42,483	35,329	140,667	163,880
Zinc shipments (net tons) <sup>l</sup> .....	42,311	38,159	38,455	149,992	166,856
Deliveries of tin (gross tons) <sup>l</sup> .....	6,235	5,520	5,825	19,825	23,990

† Three months' average.

Source of figures: <sup>a</sup>Lake Superior Iron Ore Association; <sup>b</sup>Bureau of Mines; <sup>c</sup>THE IRON AGE; <sup>d</sup>Bureau of the Census; <sup>e</sup>American Iron and Steel Institute; <sup>f</sup>National Association of Flat-Rolled Steel Manufacturers; <sup>g</sup>American Institute of Steel Construction; <sup>h</sup>United States Steel Corp.; <sup>i</sup>United States Engineer, Pittsburgh; <sup>j</sup>When preliminary, from Automobile Manufacturers Association—Final figures from Bureau of the Census; <sup>k</sup>F. W. Dodge Corp.; <sup>l</sup>Railway Age; <sup>m</sup>National Machine Tool Builders Association; <sup>n</sup>Foundry Equipment Manufacturers Association; <sup>o</sup>Department of Commerce; <sup>p</sup>British Iron and Steel Federation; <sup>q</sup>American Bureau of Metal Statistics; <sup>r</sup>American Zinc Institute, Inc.; <sup>s</sup>New York Commodities Exchange.



Same Week Last Month	Preceding Week	Last Week
77.5	75.5	75.5
89.3	87.9	88.5
98.4	93.9	94.0
57.0	58.7	59.2
82.9	82.3	82.8
59.5	53.8	53.8

COMBINED INDEX
Steel Ingot Production
Automobile Production
Lumber Shipments
Pittsburgh Industrial Production
Heavy Engineering Construction

Same Week 1935	Same Week 1934	Same Week 1933
55.0	57.0	45.0
54.7	75.3	58.3
71.4	54.3	40.6
48.6	49.5	49.6
61.9	69.3	50.3
38.1	35.4	26.2

ALTHOUGH four of the five component indices which contribute to make up THE IRON AGE combined index of capital goods activity made slight gains last week, these were so fractional as not to warrant a change in the combined index itself. The remaining component continued at its previous level. In most cases, the slight gains occurred only after adjustment for normal seasonal change. Lumber shipments showed a gain both in actual volume and in adjusted index form, but steel and automobile production showed losses prior

to seasonal adjustment. Heavy engineering work in progress held unchanged, the first interruption in a steadily declining trend since the beginning of April. The Pittsburgh index moved fractionally higher.

At 75.5 per cent of the 1925-27 average, the capital goods index is unchanged from the previous period, 2 points under its level a month ago, but 20.5 points, or 37 per cent, above where it stood in the corresponding week of 1935.

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Cram's Reports, Inc.; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District, from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from Engineering News-Record.



... *Washington wonders why relief rolls grow in face of increasing industrial employment.*

... *Tax legislation still muddled, but nothing hinders passage of latest boondoggling funds.*

... *Silicosis legislation not to be passed at this session of Congress.*

... *A. F. of L. threatens to suspend large industrial unions.*

By L. W. MOFFETT

Resident Washington Editor  
*The Iron Age*

hard bumps in the way of ever-mounting taxes . . . and the greater the income the greater the ratio of outgo! . . . Relief there must be, but not on its present extensive scale under the direction of a cumbersome bureaucracy centering in Washington with a wide ramification of offices and personnel throughout the country and with its bad odor of politics. . . . The more efficient, less expensive way by turning relief over to the jurisdiction of local communities and the states is thrust aside, with no relief for the groaning taxpayer who has more groans coming to him. . . . And there is no approach to a balanced budget. . . .

Relief rolls, in the face of business improvement, increase or change but little rather than decrease. . . . Instead of giving industry relief and greater freedom to reemploy the idle which is so insistently urged, business is burdened with additional taxes and political straitjackets. . . .

An example of onerous taxes is seen from the experience of the United States Steel Corp., which paid \$38,500,000 or the equivalent

**W**ASHINGTON, June 2.— Taxes and more taxes. . . . Relief appropriations and more relief appropriations. . . . More Treasury bond issues to raise new money. . . . The Federal budget becoming increasingly unbalanced. . . . The national debt rising to the incomprehensible height of \$35,000,000,000. . . . No move to cut down expenditures or to tear down an unparalleled spendthrift bureaucracy engaged in a multiplicity of bewildering and strange activities. . . .

Such is the dreary song of Washington . . . with its dominant note keyed to political expediency and the ensuing elections. . . .

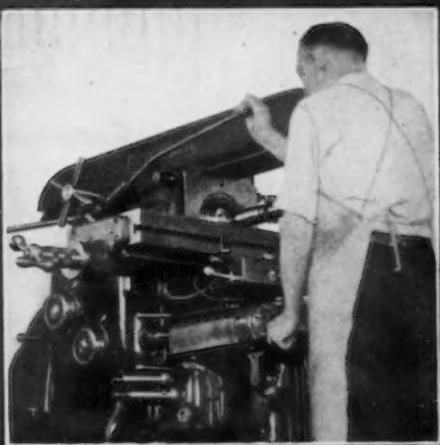
Industry pulls hard on the road to recovery and as it makes progress it finds its speed retarded by

of \$5.14 per ton of finished steel in local, state and Federal taxes in 1935, and netted 15c. per ton profit! This was after being in the red for four successive years. . . . Authority for the statement is William A. Irvin, president of the corporation. . . . Like other steel companies throughout the industry, it had to plunge heavily into its surplus to spread work and provide direct relief for employees; the latter expenditures that otherwise would have fallen on the Federal Government. . . . The steel industry did this freely in discharge of a social obligation and sought no praise for it. . . . But it is weary of demagogic criticism that it has been indifferent to the distress of its workers. . . .

Again, in the face of more taxes and of a Federal program that increases unemployment, demand is made that industry absorb more of the unemployed, even though some of the industries, such as the steel and automotive, have peak payrolls at top wages. . . . But in view of growing labor agitation and strikes which are spreading over the country there is concern that instead of greater employment there will be less. . . . Inasmuch as the Administration is trying to make a great ado over recovery—anomalous in the face of the vast number of unemployed and growing debt—it is easy to understand apprehension shown over the disturbing labor situation, for it has dangerous political potentialities. . . .

Whatever the outcome of the tax muddle, characterized by a second revolt of Democratic members of the Senate Finance Committee against the Administration's corporate surplus distribution plan, it is certain industry will have to ante further regardless of what may be done in the way of boosting income tax rates in either the normal or surtax brackets, or both. . . . The latter is a source of fright among the politicians, though inevitable sooner or later. . . . That is to say,

# WORKING . . . *not* WALKING



The operator in the upper picture is showing you how easy it is to change feeds by power. In the other picture, he is engaging the power rapid traverse from the rear

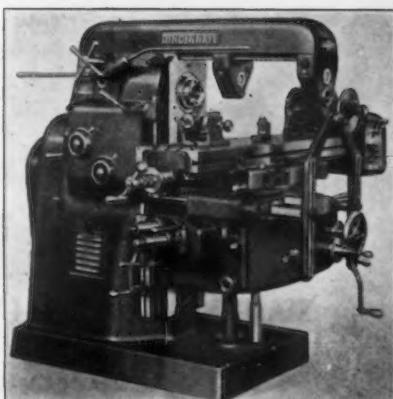
**S**TAY where you are—at the front or rear of the Dial Type—to change speeds, feeds, or engage the quick traverse. No need to circle around to the front of the machine to adjust the vertical or cross movements. You can do all these things from both the front and rear operating positions, and the speed-feed changes are almost effortless because the machine does the work of shifting gears. No walking—power feed and speed changes . . . a combination which literally invites the most efficient manipulation of the machine.

The operator likes the dual controls and power speed and feed changes because they mean less effort; the power behind the purchase likes them because they mean more work-pieces per dollar expended.

THE CINCINNATI MILLING MACHINE CO.  
CINCINNATI, OHIO, U. S. A.



A SYMBOL OF A DEFINITE STANDARD OF WORTH



Cincinnati Universal High-Speed  
Dial Type Milling Machine

before or after election, most probably the latter. . . .

Rejecting the monstrosity which the House passed as a tax bill with Administration prodding as it insisted upon high rates ranging up to 42½ per cent to compel distribution of corporate surpluses, the Senate Finance Committee finally emerged after sharp battle and a deadlock broken by Vice-President Garner with its own plan. . . . Conservative Democratic members

stood firmly against the House plan, reached the end of compromise, and with Republican members, brought out a bill, despite Presidential dislike, sharply upping corporation income taxes and fixing levies on dividends. . . . Bad as it is, it is better than the House plan of confiscation that would virtually deprive corporations of surpluses so necessary in periods of depression to aid unemployed and to improve and modernize their plants. . . .

The Senate bill kites by 3 per cent the present corporate income tax rates, so as to range from 15½ to 18 per cent; fixes a 7 per cent additional tax on undistributed corporate profits as against no present surtax and as compared with the maximum of 42½ per cent in the House bill; provides a 4 per cent individual income tax on dividends while now there is no such tax; continues present capital stock and excess profits taxes and increases by 1 per cent the surtax in upper brackets on incomes from \$6,000 to \$50,000. . . . These provisions and other proposals, this ever-piling up of taxes, with still more to come, still are far short of the enormous sum of \$1,137,000,000 which the President has asked in permanent and temporary taxes. . . . What the final tax program will be remains for conference and White House approval. . . .

It is always the practice of addition, not of subtraction. . . . Increasing taxes, not decreasing expenditures. . . . But industry and the public generally, even as the load is laid on their backs—and one cannot be taxed without taxing the other—are being told we are "on the way." . . . And we are. . . . Unless a halt to these tremendous expenditures and weird experimentation is called quickly, we are on the way to bankruptcy and inflation. . . . The present fool's paradise is the pupa stage. . . .

Coming along for continuance of the spending spree is another \$1,425,000,000 relief appropriation from the Senate Appropriations Committee. . . . That is to say, it is called a "relief" bill but like other relief bills, has the possibilities of vast boondoggling. . . . Also like the bill previously passed by the House, the Senate measure leaves entire responsibility for administration in the hands of the President. . . . Which means the great bulk will go to spendthrift Harry L. Hopkins, WPA administrator. . . . But \$250,000,000 for loans and grants is earmarked, or supposed to be earmarked, for Harold L. Ickes, who is said to have salvaged this amount for PWA after sharp differences with Mr. Hopkins who wanted the whole thing. . . . Also Brain Truster No. 1, Dr. Rexford G. Tugwell, whose Sovietized ideas appear to be worked into a great deal of New Deal pattern of legislation and administration, is assured he can maintain his amorphous Resettlement Administration, with its some 20,000 employees celebrating schemes to transplant sections of the population, and then tear them loose again to "settle" them somewhere else, only to find that they want to return to their first moor-



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ings.... The grandiose Resettlement Administration, like the WPA, was set up by executive fiat, not by legislation. . . . This latest "relief" appropriations brings the total "relief" appropriation turned over to the President to the neat little sum of \$6,315,000,000! and, like taxes, more is to come. . . . Or at least, to be asked.

Marking an unprecedented peace-time total the new bond issues scheduled by the Treasury for June 15 will probably be in excess of \$2,000,000,000. . . . About half is to be used to redeem maturing issues and the other part will go as part of the huge financing program in connection with the bonus. . . . The President vetoed the cash bonus bill but was overridden by a Congress that wants the soldiers' vote at any price. . . .

We are indeed on the way—

▼ ▼ ▼

#### No Silicosis Legislation At This Session

Congress does not know when it is going to adjourn, sad to relate, but it will bring its political babel to an end without doing anything about silicosis, which was the ob-

ject of overdramatization sometime ago at the hands of a labor subcommittee, but which appears to be given sensible consideration by the Department of Labor.

The reasons given for not voting for the usual "probe" are rather amusing. The House Rules Committee decided not to act on the request of the House Labor Committee for subpoena power to compel sworn testimony of contractors on the water-power tunnel at Gauley Bridge, W. Va., scene of a rock-dust explosion, because, according to Chairman O'Connor of the former committee, the committee was "mad" at Representative Marcan-tion, New York, for saying the committee had strangled further investigation.

The Senate Committee on Education and Labor reported that "the need for action is vital but the problem is so intricate and far-reaching as not to be fully understood and dealt with without further information which is now being secured." The information is being secured by the Labor Department in cooperation with interested industrialists and others, and Congress is only too willing to leave the job to these sources.

#### Turkey Prefers American Road-Building Equipment

American road-building equipment has succeeded in gaining a dominant position in the Turkish market while American mining equipment is also gaining ground in that market, according to a report received by the Department of Commerce from Assistant Commercial Attaché J. A. Embry, Istanbul.

The fact that Turkey purchases most of its heavy industrial machinery from European sources is attributed to the liberal credit terms granted by European suppliers together with their nearness to the market and understanding of requirements. The trade envoy, however, believes that if American firms would make a careful study of Turkish requirements and endeavor to adapt sales procedure to local conditions they might eventually be able to develop a substantial demand for certain types of machine tools, particularly small lathes and metal-working machinery. The report says that the proposed reorganization of the Turkish coal industry may offer a real opportunity for the sale of American equipment. Concerning large plant



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installations, however, prospects for increased American participation are not favorable under existing conditions, the report states.

▼ ▼ ▼

### Iron and Steel Sales Make Greatest Gain

Aggregating \$36,179,000 sales of iron and steel and their products in April, 1936, registered a gain of 41.8 per cent over sales of \$25,520,000 in April of last year and of 11.8 per cent over sales of \$32,347,000 in March of the present year, according to reports from 61 establishments, included in a monthly joint study of the National Association of Credit Men and the Bureau of Foreign and Domestic Commerce, Department of Commerce.

The gain in steel sales in April of the present year over the corresponding month of last year was the largest of the 13 reporting industry groups. Collections of 53 concerns in the steel groups in April of the present year were 81 per cent of the accounts receivable as against a like percentage in April of last year and 77 per cent in March, 1936. These figures represent only the ratio of collections of the months affected to the accounts receivable at the beginning of the month. The reports on steel sales are broken into three groups: Hardware; stoves, ranges and steam-heating apparatus, and "other iron and steel products." Sales of the latter group in April of this year totaled \$32,134,000 compared with \$22,450,000 in April

of last year and \$28,749,000 in March of the present year. In this group are included sales of eight rolling mills, though other sales are also included.

Sales of machinery, not including transportation equipment, reported by 57 firms, totaled \$27,143,000 in April, 1936, compared with \$24,932,000 in April of last year and \$24,717,000 in March of the present year. Electrical machinery, apparatus and supplies made up the bulk of these sales. Reports from 22 manufacturers in this group showed sales of \$19,809,000 in April, 1936, compared with \$18,544,000 in April of last year and \$17,650,000 in March of the present year.

Total sales of 568 manufacturers throughout the country in April of the present year aggregated \$178,893,000 compared with \$154,591,000 in April of last year and \$167,572,000 in March of the current year.

### A. F. of L. May Suspend Industrial Unions

A wide-open split within the American Federation of Labor appears to be inevitable as the result of the reported decision of its executive council to suspend its nine large, heavy-dues-paying industrial unions and its insistence to continue under the craft union policy. The reported action of the council brings to a head the row that was precipitated when the Committee for Industrial Organization was set up under the chairmanship of John

L. Lewis, president of the United Mine Workers, with the avowed purpose of organizing steel and other mass producing industries on a vertical basis despite vigorous protests from President William Green of the Federation and prominent heads of craft unions.

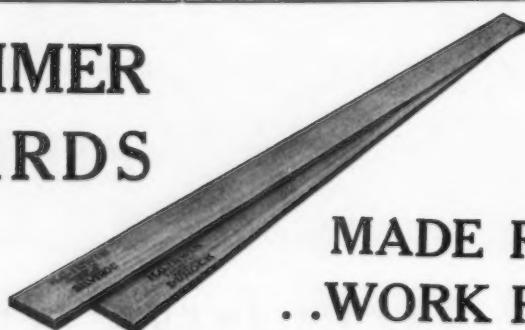
Suspension of the industrial unions, if it is enforced, would mean a loss of one-third of the Federation's membership. It would mean a much larger loss in the way of financial strength through the loss of dues whose greatest single source is the United Mine Workers.

The industrial unionists have scorned the attempt of the Federation executive council and have indicated they will bitterly fight the effort to oust them. They claim the move will fail if put to the test, said to have been determined upon by the executive council, at the next meeting of the Federation. Suspension would require two-thirds majority. Industrial unionists say the craft unionists cannot roll up the necessary votes. But in any case the feeling between the two groups is so bitter than even if the industrial unions are not formally suspended it is believed there will be heavy withdrawals from the Federation with the possibility of craft unions seeking to reorganize into a separate body should they lose control of the Federation.

Recently Mr. Lewis flatly rejected the demand of President Green to dissolve the C. I. O., and subsequently members of the executive council made a similar demand in letters addressed to heads of the unions belonging to the C. I. O., requiring dissolution within two weeks. The "ultimatum" will expire Wednesday. Mr. Lewis has said the ultimatum will not be heeded.

Meanwhile, Lewis, impatient that the Amalgamated Association of Iron, Steel and Tin Workers has not grasped the offer of the C. I. O. to cooperate with the association to organize the steel industry, sent an "ultimatum" by telegraph to the association. Directing his message to Secretary Louis Leonard of the association, Lewis told the association to cease "its fluttering procrastination" and to fall in line to organize the steel industry and warned that workers in the steel industry are "going to be given a chance to become organized with or without benefit of the association. At its recent meeting in Canonsburg, Pa., the association board went on record in favor of industrial organization but did not pledge itself to accept the offer of the C. I. O. It invited the latter's cooperation but insisted that the association would maintain its jurisdiction.

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## PERSONALS

E. J. LEES, formerly of Lees-Bradner Co., Cleveland, has been appointed chief engineer in charge of engineering and research of the National Tool Co., Cleveland. He has made outstanding contributions in the field of machine design. He was one of the first to design and



E. J. LEES

machine as companion machines for gear grinders.

\* \* \*

HARRY V. MERCER, who has been associated with the American Rolling Mill Co. since 1916, has been appointed to the newly created office of advertising manager of the company. During 14 of his 20 years of service, he has been identified with practically all phases of the company's publicity and advertising.

CARL C. JOYS, JR., vice-president and sales manager of the A. O. Smith Corp., Milwaukee, has sailed for Europe to study conditions affecting its line of products, more especially oil refinery vessels. He will spend much of his time abroad in Holland, where the Smith company transacts much of its export business.

\* \* \*

FLOYD L. GREENE has been elected executive vice-president of



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build a spur and helical gear generating hobbing machine advertised and sold in the United States. He designed and manufactured one of the first Hyperboloid hobs and was instrumental in inventing a thread miller using the ring type or multiple type of cutter. He also invented and built a gear testing



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❖ ❖ ❖

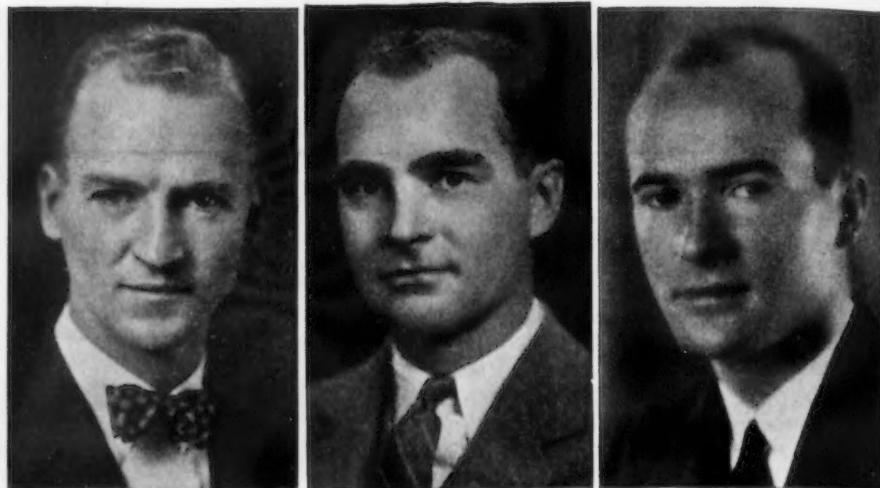
C. E. SIMS has been appointed research metallurgist at Battelle Memorial Institute, Columbus, Ohio. He received his degree in metallurgy in 1916 from the University of Utah and served for some years as metallurgist in the United States Bureau of Mines before going to the American Steel Foundries in 1927 as assistant director of research. He has written extensively on the metallurgy of iron and steel and with G. A. LILLIEQUIST was awarded the Robert W. Hunt prize in 1933 by the American Institute of Mining and Metallurgical Engineers.

❖ ❖ ❖

IRVING W. CLARK has been appointed manager of the kitchen planning section of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

❖ ❖ ❖

J. K. GILLETT, Ferro Enamel Corp., Cleveland, was scheduled to address the American Ceramic Society, Central Ohio Section, at the Battelle Memorial Institute, Columbus, June 1, and to present a sound film entitled, "An Ancient Art Becomes a Modern Industry," tracing the development and application of modern porcelain enamels. A representative of the Surface Combustion Corp., Toledo, was to discuss new developments in porcelain enamel furnaces.



E. C. ATKINS

K. W. ATKINS

H. C. ATKINS, JR.

E. C. ATKINS, who as announced in these columns last week has been made first vice-president of the E. C. Atkins & Co., Indianapolis.

K. W. Atkins, new vice-president and general manager.

H. C. Atkins, Jr., who has been promoted to the superintendency.

M. H. WATKINS has been appointed assistant manager of tin plate sales of the Youngstown Sheet & Tube Co., Youngstown, with headquarters in Chicago. Mr. Watkins was connected with the company's Cleveland district sales office for several years and has been associated with the tin plate sales department at Chicago since 1934.

GEORGE GIBBS, Gibbs Steel Co., Milwaukee, has been elected president of the Wisconsin chapter of the American Steel Warehouse Association, Inc. Other new officers are: L. R. MOISE, Moise Steel Co., Milwaukee, and R. E. ST. JOHN, Morley-Murphy Co., Green Bay, vice-presidents; GEORGE SMITH, Joseph T. Ryerson & Son, Inc., Milwaukee, secretary-treasurer and L. R. MOISE, national director.

❖ ❖ ❖

D. V. SHERLOCK and L. DOUGLAS SMITH have been elected directors of the Blaw-Knox Co.

❖ ❖ ❖

F. H. CHAPIN, president, and A. E. DRISSNER, vice-president in charge of engineering, of the National Acme Co., Cleveland, have gone to Europe for a several weeks' trip.

❖ ❖ ❖

HARRY W. DIETERT has resigned from his position as chief engineer of the U. S. Radiator Corp., Detroit, to devote more time to his own firm, the Harry W. Dietert Co., manufacturer of sand, core and mold testing equipment. Mr. Dietert has been retained, however, as consulting engineer to the U. S. Radiator Corp.

❖ ❖ ❖

JOSEPH W. ROBINSON, for several years president and general man-

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Lang's Lay  
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Hemp Center  
•  
Wire Rope Center  
•  
Metallic Core  
•  
Seale - Filler Wire  
Warrington

ager of the Libbey Glass Mfg. Co., at 44 has relinquished his job and other active business pursuits to devote his entire time to the Toledo Newsboys' Association.

❖ ❖ ❖

A. H. FRAUENTHAL, formerly assistant general manager of the Bantam Ball Bearing Co., Detroit, has been made vice-president and general manager, succeeding KARL HERRMANN. Mr. Frauenthal has been with the Bantam organization since 1930, during which time he



A. H. FRAUENTHAL

spent several years in the field as sales engineer. He was manager of the steel mill division before his appointment as assistant general manager. Although Mr. Herrmann is retiring from his major duties as general manager, he is being retained as a consulting engineer. Before going with the Bantam company, Mr. Herrmann was identified for over 20 years with the Studebaker Corp. After a vacation, he plans on reentering some phase of the automotive field.

❖ ❖ ❖

A. W. DODD has been elected vice-president of the American Zinc, Lead & Smelting Co.

❖ ❖ ❖

\*C. J. QUALTER, for a number of years assistant manager of the gear department of the Meisel Press Mfg. Co., Boston, has been made manager, succeeding the late Sydney A. Smith.

❖ ❖ ❖

JOHN HUGHES, who retired as assistant to the president of the United States Steel Corp. Jan. 31, has become associated with his son,

JOHN F. HUGHES, in the copartnership of Hughes & Co., members of the New York Stock Exchange. The new company will have offices with Harriman & Keech at 11 Broadway, New York. John F. Hughes, who has been a member of the New York Stock Exchange since 1929, was previously a partner in the firm of Barry & Hughes, which has been dissolved.

❖ ❖ ❖

C. W. BENNETT, president, American Sheet & Tin Plate Co., will retire on June 1. His first occupation, after his graduation in mechanical engineering from the University of Wisconsin in 1892, was with the Marinette Iron Works, West Duluth, Minn., as a

machinist. After a short period with the LaCrosse Plow Works, he associated himself with the mechanical department of the World's Fair. In 1894 he joined the Illinois Steel Co. as a draftsman and assistant to the master mechanic. Three years later he joined the American Tin Plate Co. at its Ellwood, Ind., works, and was located there nine years, first as master mechanic and later as manager of the Indiana mills of the company. In January, 1906, he was transferred to Pittsburgh and appointed assistant to the president. In November, 1925, he was elected vice-president, and on January 1, 1934, was made president of the company. Mr. Bennett has announced no plans for the future.

## "How do Duriron Company Products fit into our picture?"

readers of *THE IRON AGE* may ask

Well, here's a list of *The Iron Age* readers from auto manufacturers to wire mills who have corrosive solutions to handle in their plants. They have purchased the following Duriron Company Products to reduce the toll of corrosion.

Tube Mill—Pumps, valves, special castings  
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Ball Bearing Mfr.—Duriron pipe, fittings.  
Steel Mill—Duriron steam jets, valves  
Wire Cloth Mfr.—Durichlor pumps  
Enameling Plant—Duriron Jets, valves  
Meat Packing Equip. Mfr.—Durco KA2S castings  
Sheet Mill—Duriron tank outlets  
Wire Mill—Durichlor castings  
Metal Refining Co.—Duriron steam jets  
Brass Goods Mfr.—Durco KA2S castings  
Steel Products Co.—Duriron tank outlets  
Electrical Equip. Mfr.—Durimet Pickling racks, bars  
Rope Mfr.—Durco KA2S fittings, special castings  
Bolt Mfr.—Duriron steam jets  
Wire Rope Mfr.—Duriron valves  
Steel Fabricators—Duriron steam jets

This will give you an idea of what other people are doing with Duriron Company Products. Why not write and find out if we can be of any help to you in handling corrosive solutions. You will be under no obligation, and we'll be glad to send you free technical bulletins on our products.

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## OBITUARY

FERDINAND W. ROEBLING, JR., president of John A. Roebling's Sons Co., Trenton, N. J., died in New York on May 29, aged 57 years. Following in the footsteps of his father and grandfather, he was considered a leading figure in bridge design. He was graduated from Lehigh University in 1901 with a degree in mechanical engineering and joined the Roebling plant in Trenton as an engineer. He was appointed assistant treasurer in 1914 and secretary-treasurer three years later. He was named vice-president in 1921 and became president in 1926. Mr. Roebling prepared the plans for the construction of the Williamsburg Bridge in New York and designed machinery for wire drawing that is still in use.

♦ ♦ ♦

SYDNEY A. SMITH, manager of the gear department of the Meisel Press Mfg. Co., Boston, died on May 25. He had been identified with the company for 28 years.

♦ ♦ ♦

WILLIAM B. ANDERSON, president, Buckeye Iron & Brass Works, Dayton, Ohio, died on May 27, aged 80 years. He had been identified with the company for 60 years. He

started his career with the company as a bookkeeper, later becoming secretary, and had been president since 1917.

♦ ♦ ♦

CECIL MARTIN, secretary-treasurer of the Worden-Allen Co., Milwaukee, structural steel fabricator, and manager of its Chicago office since 1910, died on May 25, aged 55 years. He became associated with the concern shortly after his graduation from Harvard University in 1909.

♦ ♦ ♦

WILLIAM H. STOKES, president of the Stokes Brothers Mfg. Co., Freehold, N. J., since its incorporation in 1888, died on May 6, aged 86 years.

♦ ♦ ♦

J. L. WALTHALL, assistant manager of the Birmingham branch of the Crane Co., died on May 10.

♦ ♦ ♦

J. P. SYLVESTER, who from 1901 until his retirement in 1920 was an associate of the Sylvester Co., operator of the Danvers Iron Works, Danversport, Mass., died on May 20, in Salem, Mass. He was born in Somerville, Mass., 62 years ago, and was graduated from Harvard University in 1895, where he was professor of chemistry before associating himself with the family business.

♦ ♦ ♦

LINCOLN B. PATTERSON, formerly head chemist of the Emporium

Iron Co. and later of the Mystic Iron Works, died on May 22, at his farm in Kingston, N. H., where he was living in retirement. He was born in Norristown, Pa., 69 years ago.

♦ ♦ ♦

JOHN C. WILLIAMS, president, Weirton Steel Co., died suddenly at his home at Weirton, W. Va., on June 1. He was born at Kidwelly, Wales, on March 31, 1876, and attended school in his native coun-



J. C. WILLIAMS

try. He obtained his early experience in the steel business in Welsh mills and also in Italy. In 1897 he came to the United States, and shortly after his arrival became superintendent of the Champion Iron & Steel Co., Muskegon, Mich. In 1903 he was made assistant superintendent of the Monessen, Pa., plant of American Tin Plate Co. In 1905 Mr. Williams participated with Ernest T. Weir, David M. Weir, J. R. Phillips and several others in the formation of the Phillips Sheet & Tin Plate Co., Clarksburg, W. Va., which was to grow into the Weirton Steel Co. He was in charge of operations at this plant and later occupied a key position in the building and operation of the Weirton plant. He became president of the Weirton company in 1929, at the time of its affiliation with other steel and ore organizations that joined in the formation of the National Steel Corp., of which he was a vice-president. Mr. Williams was also president of the Weirton Coal Co., president of Weirton Improvement Co., president of Midwest Steel Corp., and a director of the Great Lakes Steel Corp., the Michigan Steel Corp., Hanna Iron Ore Co. of Delaware, Hanna Furnace Corp., and the Producers Steamship Co.

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A. C. ADAMS



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J. C. ECKEL



G. E. TOTTEN

## Sheet and Tin Plates Sales Managers Named

FOLLOWING the recent merger of the American Sheet & Tin Plate Co. with Carnegie-Illinois Steel Corp., a sheet division and a tin plate division have been created. Avery C. Adams, formerly vice-president in charge of sales for the General Fireproofing Co., Youngstown, has been named manager of sales of the sheet division. G. G. McGlaughlin and J. C. Eckel have been appointed assistant man-



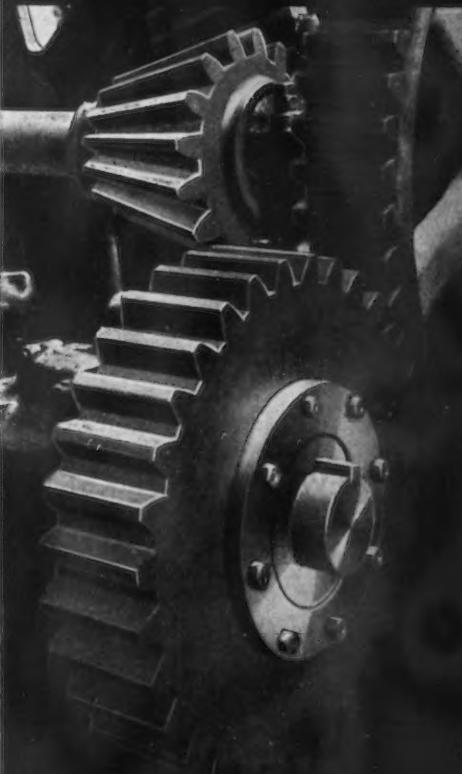
J. C. WHETZEL

agers of sales. The latter two men have been actively connected for some time with the sales department of the American company.

George E. Totten, as manager of sales, will take charge of the newly created tin plate division, with J. C. Whetzel as assistant manager of sales. Mr. Totten has recently been the plate sales manager for Republic Steel Corp. and previously was with Jones & Laughlin Steel Corp.

# INSUROK

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Indianapolis, Ind.



## Amalgamated Faces Hard Job in Its Efforts to Organize Steel Workers

PITTSBURGH, June 2.—Without attempting to determine the wishes of the 350,000 odd steel workers, the Amalgamated Association of Iron, Steel and Tin Workers is to take upon itself the duty of organizing them into a national industrial union, notwithstanding the fact that this association has only about 5000 members, has existed for years, and only became solicitous about the steel workers' welfare since the NRA days.

After two years of a "do nothing" policy on the part of the American Federation of Labor, after they had promised the Amalgamated Association help in organizing steel workers, John L. Lewis, through his Committee of Industrial Organization, brought the matter to a head, with the final result that the association, at their recent convention at Canonsburg,

decided to accept the help of both Green and Lewis in their attempt to organize the steel industry. Since the main reason for taking so long to come to a conclusion on this matter was caused by internal bickering, it is not supposed that this type of jurisdictional disputation will cease spontaneously now that responsibilities have been placed—this has not been the history of the labor movement in this country.

Meanwhile the majority of steel employees have been and are making good progress with management through their plans of employee representation. Some of these plans have been in existence for years, while others are of recent origin. Their success in so short a time is ample proof that this form of collective bargaining, which considers problems of employees and management to be mu-

tual, is the only one that will succeed in the long run.

Unionization, as now practised in this country, seems to be based upon the fact that any relations between workers and employees are antagonistic, and that bitter strife and striking must be the methods of settlement rather than conferences based on a community of interests. Representation plans recognize the rights of both parties to meet and discuss facts involved in questions up for consideration, thereby reaching a logical and sane conclusion which can't help but be acceptable to both parties. In the case of these employee representation plans, management deals with representatives who have a thorough knowledge of plant conditions, and who are able to understand the proper perspectives of both parties. Such could not possibly be the case should dealings be had with an "outsider," who not only lacks knowledge of plant conditions, but is extremely antagonistic to begin with. It is not to be supposed that instantaneous success will result upon the adoption of representation plans,

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# DIVIDENDS FROM BAKER MACHINES

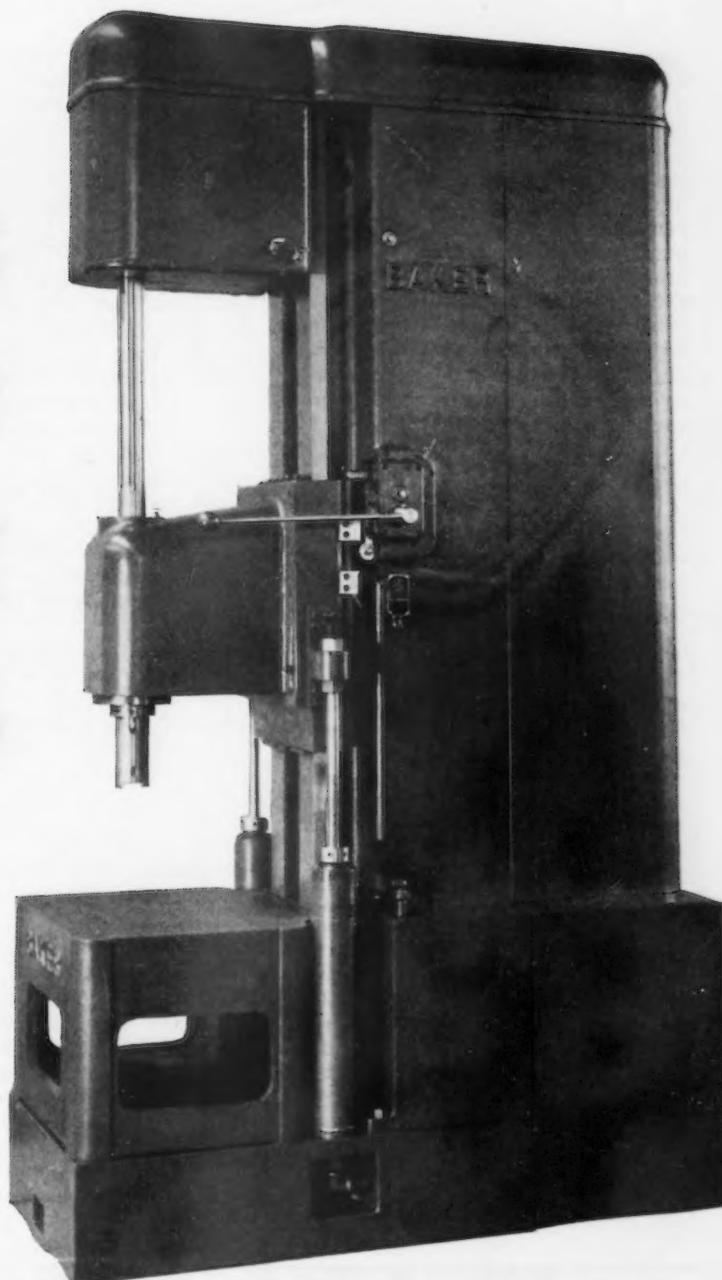


In production including operations of drilling, boring or tapping, modern Baker machines can quickly pay for themselves. The new "Clean Line" developed by Baker is a line of machines outstanding in appearance as well as efficiency.

The illustration shows size number 2, the 20 HO. This has the patented "twin pull" feed construction and is equipped with table, single spindle, the new oil gear pump, and splined spindle drive. All parts are covered but readily accessible for adjustments if necessary.

The 20 HO has a No. 5 Morse taper single spindle capacity and can be furnished in multiple spindle or single spindle, and single purpose or quick change type.

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**"CLEAN LINE" No. 20 HO**

**BAKER BROTHERS, INC., TOLEDO, OHIO**

**\* BAKER \***

when it is realized that workers have been continually stirred up by demagogues with half-baked ideas, who, as a matter of fact, never worked in the industry and know nothing of its problems. When and where plans of representation have gained the faith of employees and management, the results have been consistently beneficial to both parties. It is enough to say that such plans are working today, and those in the initial stage will prove more satisfactory as both parties come to understand each other's viewpoint.

Practical results have been and are being realized daily. Increases in pay have been given, inequalities of rates have been adjusted, working conditions have been bettered, and most important of all, elections have shown that this form of collective bargaining is desired by the majority of steel workers. As a result of petitions on the part of employee representatives last fall, management and these representatives have for the past seven months been working on the question of vacations with pay, which just recently were announced as applicable to all employees with five years or more service. In one case vacation privileges were extended to those with services under five years. Due to decreased earnings on the part of the steel companies both last fall and during the first quarter this year, this question was a difficult one to decide. Although the prospect of better earnings during 1936 helped in a large measure to extend the vaca-

tion privilege to employees, nevertheless a full measure of credit must go to the employee representatives and management for their cooperation and understanding in finally evolving the vacation set-up.

While the major results of conferences between management and employees have been well publicized, nevertheless their mutual problems have been and are being solved continuously. Safety programs have been worked out, employees have cooperated with management in cutting down costs, various recreational activities have been introduced, and a host of other changes have been brought about, due either to the presentation by employee representatives to management, or by management taking the initiative. Employees in the steel industry, through their representatives, are given facts concerning the operations and costs of the various plants, which at one time were thought to be knowledge intended only for management, but the latter realize that the full facts of the business should be known by every employee, so that they will be in an adequate position to judge the decisions reached between representatives and employers when such decisions are passed down to them.

It is hard to see just what the Amalgamated Association could offer the steel employees over what they have now, not even considering the fact that the employees would be bound to pay monthly dues. As a matter of review, steel workers on the whole work 8 hr.

a day, 40 to 48 hr. a week, their average hourly rates are as high, if not higher now, than they were in 1929, and they compare favorably with other rates of pay in industry.

The average steel worker has always been interested in what he got in the pay envelope, and since the steel companies were not receiving orders for their products, it was obviously impossible to give the men any more work than that required to complete orders. Now with a paid vacation and employee representation, by which employees and management may iron out their mutual problems, it would seem doubtful that the Amalgamated or any other union has much chance of organizing the steel industry. Another matter not mentioned very often, but nevertheless true, is the fact that the majority of steel workers are more or less indifferent to unions and have no desire to affiliate with such organizations. The unions evidently realize this, since such absurd requests as a 50 per cent increase in pay have been dangled before the men as a reason why they should "join up."

With an enlightened outlook toward employees on the part of management, and a more comprehending and understanding attitude on the part of employees toward management, it is probably true to say that the establishment, followed by concrete and worthwhile results on the part of the employee representation plans, presages a new era in employee relations in the steel industry.

## To Form Corporation Of Scrap Exporters

A CORPORATION of scrap exporters will be promptly formed under the Export Trade Act, or Webb-Pomerene Law, according to an announcement by David J. Joseph, chairman of the American Scrap Exporters' Conference. This decision was unanimously made at the meeting of the advisory board of the conference following the general meeting.

Benjamin Schwartz, director general of the Institute of Scrap Iron and Steel, has been authorized to prepare the necessary papers, for submission and approval by the Federal Trade Commission, which is in charge of all export corporations or associations formed under the act. Membership of scrap exporters in the corporation will be by invitation.

Consideration was also given by



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the conference to the formation of a Central Shipping Bureau, to charter cargo space on a cooperative basis. The board instructed Mr. Schwartz to make a complete investigation of the plan and to submit a report as soon as possible. In addition, a preliminary fund of \$25,000, for organization and promotional purposes, was proposed, of which the largest part was pledged at the meeting.

## Auger Steel Successful Against Dust Hazard

THE impending legislation insuring the anthracite coal miner against disability of disease (miners' asthma, miners' tuberculosis, or more widely known of late due to the wide publicity of silicosis as anthracosis) will no doubt affect the cost of production of hard coal inasmuch as enforced increased compensation will affect the operator, and the modes of preventing excess dust will cost the individual miner more to change his machinery to meet the requirements for cleaner mining. In most cases the individual miner owns his own pneumatic hammers, employing in the most part  $\frac{3}{8}$ -in. hexagon hollow drill steel, thus permitting a flow of dry air directly from the compressor through the jackhammer, through the hole in the steel to the end of his cut, and returning to the miner's face, laden with dust, which naturally is taken into his mouth and nose.

For years the mining industry has been seeking means of preventing the inhalation of coal dust. The most widely employed method, of course, is the use of jackhammers equipped to carry water forced by air pressure through the pistons and into the hole. Naturally, this type of machine is more expensive than the regular jackhammer and although the old-type hammer may be changed over to the water-type, the cost to the average miner is almost prohibitive. This fact, together with the responsibility of furnishing water to each miner in a widespread operation, which responsibility would fall upon the coal operator or the coal company, would make the wet mining undesirable, both to the company and the individual.

Several hundred types of respirators have been tried and in practically all cases have proved themselves undesirable for general use due to their inability to prohibit the inhalation of dust constantly and to the general discomfort caused by perspiration and awkward attachments to the head.

The only satisfactory solution to

the problem, according to many students of the subject, has been found by using, instead of a hollow hexagon or round drill steel, an auger steel heavy enough to withstand the shock of percussion drills and one of a quality that may be used both in coal and in rock.

Since the arrival of the detachable bit the auger stem is much more desirable since the necessity of carrying the heavy steel to the surface for resharpening is removed. The dust, instead of blow-

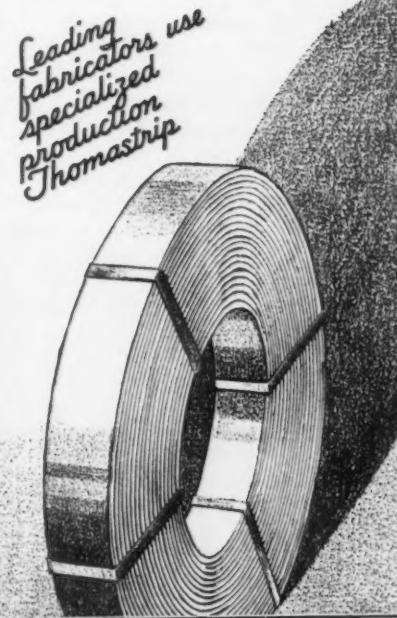
ing into the miner's face falls to the floor at the end of the hole, thus practically eliminating the inhalation of dust, and since the dust is dropped in a pile on the floor, it permits better vision for the miner and reduces the possibility of cuts and bruises caused by poor vision in the chamber.

Practically every steel company interested in coal excavation has attempted to roll an auger steel with the qualities demanded. A. Milne & Co., New York, are fur-

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Year after year Thomas Steel has the privilege of proving to an increasing number of metal fabricators that better products, better service and better profits result from the use of Thomastrip. Thomas specialized production provides exclusive attention and concentration on the proper specification, exacting manufacture and dependable delivery of one product—cold rolled strip steel. The experience, the modern facilities, and the engineering resourcefulness of this specialized organization assures to each individual customer that complete dependability of material and service which progressive management demands. It will pay you to investigate Thomastrip for your product.

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STRIP STEEL

BRIGHT STEEL-ZINC COATED  
COPPER COATED

nishing in some sections of the anthracite region what is known as their Section VII auger drill steel and find that it is the only one of their numerous auger steels that removes the dust, eliminating the use of water, and the only one that is able to stand up both in rock and in coal with the regular percussion jackhammers that may be used instead of the rotation hammer which in most cases is useless in rock.

## Weirton Employee Vacation Plan

ACCORDING to the magazine *A* of the Weirton Steel Co. employees, *Weirton Steel Employees Bulletin*, vacations with pay or payment in lieu of vacations with pay will be granted to employees of the Weirton Steel Co. during the current year. The vacation plan is the result of several months' work and cooperation on the part of the employees' representatives and management.

"The amount of vacation pay for all hourly employees, according to the publication, "will be the employee's current hourly wage as of July 1, 1936, multiplied by the number of hours to which he or she is entitled, the credited number of hours in each case being based upon the continuous service record figured up to and

including June 30, 1936. If on July 1 an employee then on the payroll has a continuous service record of at least one year but less than five years, the vacation credits will be calculated on the basis of two days of 8 hr. each. However, if on July 1 an employee then on the payroll has a continuous service record of five years or more, the vacation credits will be calculated on the basis of the average number of hours worked per week during the 12 months from July 1, 1935, up to and including June 30, 1936; but in no case shall the number of hours be less than 40 nor more than 48."

As far as actual time off for vacations, the magazine says that "employees taking their allotted time off for vacations will be given two consecutive days, when service credits are one year but less than five years, and seven consecutive days when service credits are five years and over. In all cases when time is to be taken off for vacations, vacation pay will be payable in advance of the vacation period."

Employees eligible for vacations, who elect to work rather than take time off, will receive the vacation wage in a lump payment during the week of Dec. 1, 1936.

"The number of vacation hours for which eligible employees will receive vacation pay will be calculated the same for piece-work and tonnage employees as for regular

hourly-rate employees, as outlined previously. The base hourly rate of vacation pay for piece-work and tonnage employees will be determined by dividing the amount of money earned during June, 1936, by the number of hours worked in that month. This will produce a current average hourly rate of earnings which will be multiplied by the number of vacation hours to which employees may be entitled, based upon his or her service credits. The result of this multiplication will determine the amount of vacation pay for employees working on a piece-rate or tonnage basis.

"Where time is to be taken off for vacations, such time will be scheduled between July 1 and Dec. 31, and at such times during this period as the management finds most suitable, considering both the wishes of the employees and the efficient operation of the mill or department concerned. In the event employees eligible for vacations are laid off, because of curtailed operations, or lack of work, between July 1 and Dec. 31, 1936, such employees will receive the amount of vacation pay to which he or she may be entitled, which will be payable in a lump sum during the week of Dec. 1, 1936." Provisions have been made in the event of the death of the employee to pay the vacation payments to the deceased's beneficiary.

## Will Direct U. S. Steels Public Relations

J. CARLISLE MACDONALD has become associated with the executive personnel of the United States Steel Corp. as an assistant to Myron C. Taylor, chairman of the board, and will be engaged in public relations work.

He attended St. Louis University. Stevens Institute of Technology and an English university, and began his business career as a reporter for the St. Louis *Star* in 1911. He was member editorial staff St. Louis *Post Dispatch*; correspondent New York *World*, in Paris, during World War, visiting various fronts, toured Belgium after evacuation by Germany; and was correspondent New York *Herald* and 30 associated papers during entire Peace Conference. He accompanied President Wilson on his European tour; joined foreign staff Associated Press, February, 1920, resigned 1923; appointed member foreign staff New York *Times*. Since 1931 he has been public relations counsel for Guggenheim Brothers, New York.

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*Members New York Stock Exchange*

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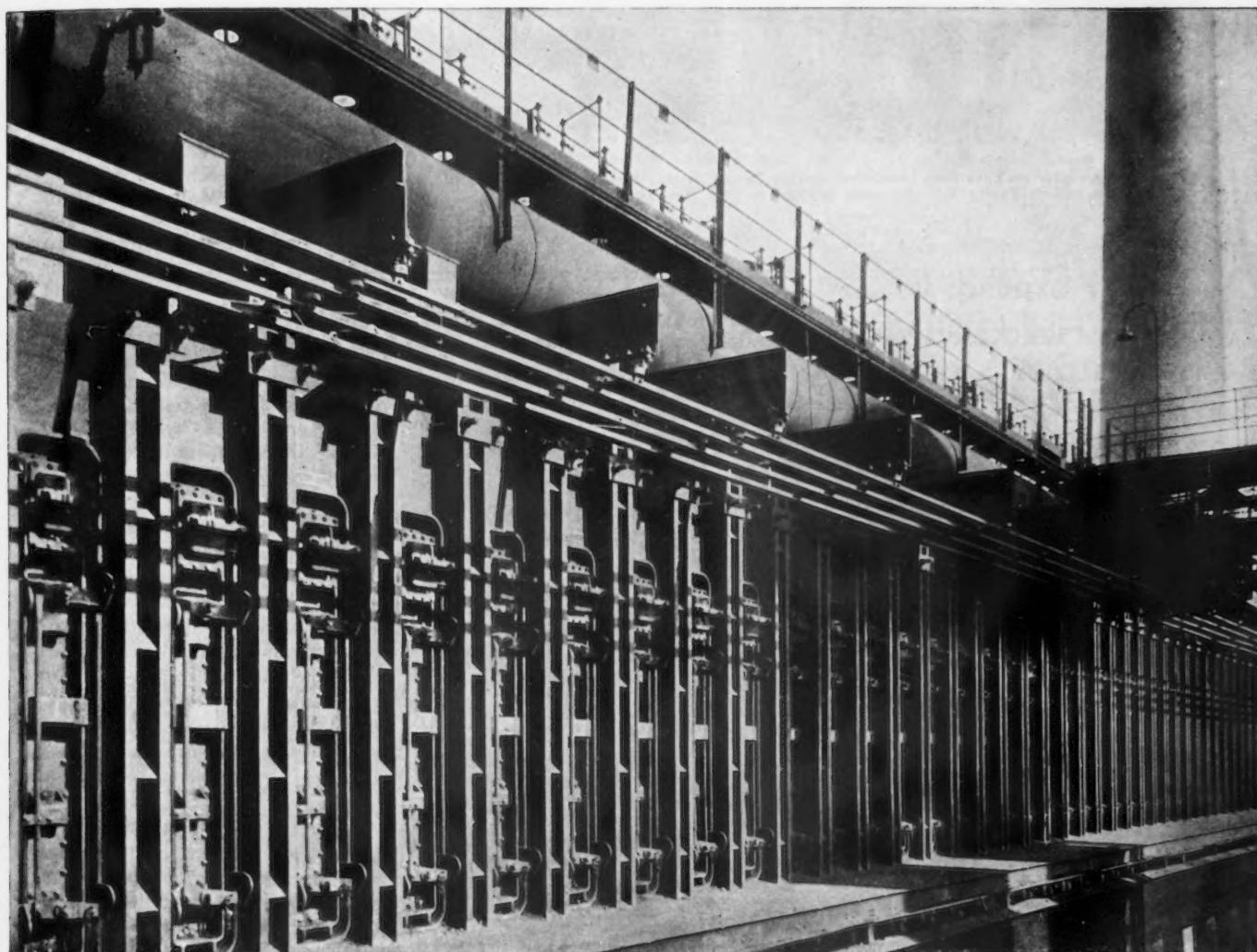
**JOHN HUGHES**

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*Member New York Exchange*

**June 1, 1936**

# **BECKER TYPE LOW DIFFERENTIAL BY-PRODUCT COKE OVENS**



## **KOPPERS OFFERS:**

BECKER OVEN PLANTS . . . GAS PRODUCERS . . . WATER GAS PLANTS . . . LIQUID PURIFICATION PLANTS . . . PHENOL REMOVAL PLANTS . . . MATERIAL HANDLING PLANTS . . . BY-PRODUCT EQUIPMENT . . . BENZOL PLANTS . . .

● The new BECKER OVENS, characterized by exceptionally low differential pressures represent an advance of prime importance in the economical production of steel. More precise control of coke and gas quality is characteristic of these ovens.

● The pioneer installation at Camden, New Jersey, placed in operation in October, 1935, has already demonstrated a distinct advance in the art of coking. The use of the Becker Type Ovens should be considered in every building and modernization program in the steel industry.

**KOPPERS  
CONSTRUCTION  
COMPANY  
PITTSBURGH, PA.**



New and larger quarters have been established for the Detroit factory branch of P. R. Mallory & Co. and its Yaxley Manufacturing Division at 2449 East Grand Boulevard.

## Mallory Expands Its Detroit Headquarters

P. R. MALLORY & CO., INC., and its Yaxley Manufacturing Division of Indianapolis, have moved their Detroit offices into new and larger quarters at 2449 East Grand Boulevard from their former address at 7310 Woodward Avenue. Open house was held at the new address on May 27, for the company's friends in the industry. P. R. Mallory, president of the company, personally was on hand for the opening. Other prin-

cipals from the factory at Indianapolis included J. A. Wiger, vice-president and manager of the metallurgical department.

Several years ago P. R. Mallory & Co. opened a Detroit office in the person of John D. Tebben, now manager of the Detroit branch. Since that time the market has been so well developed that it has been found necessary greatly to expand the force of sales and service engineers to cover the entire field of Mallory products such as Elkonite, Alkaloy and Mallory 3 metal welding electrodes, as well as other special metals chiefly used

in the construction of resistance welding machines; sheet tungsten; molybdenum; electrical contact points of tungsten and the like, such as are used for ignition points in automobiles; dry electrolytic condensers; battery rechargers and rectifiers. In the Yaxley line are included a large number of radio parts such as volume controls, rheostats, plugs and jacks, and selector switches.

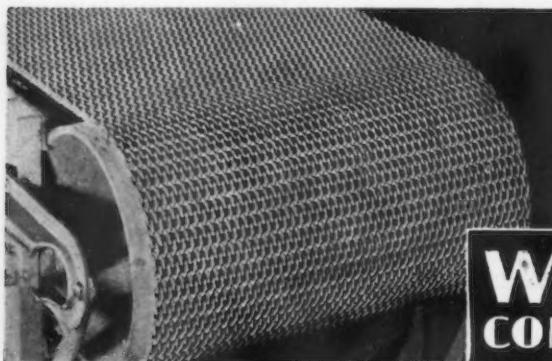
Assisting Mr. Tebben will be James L. Cathon, Jr., who until very recently was sales manager for the Bonny-Floyd Co., Columbus, Ohio, steel founder. Frank Houck and Willard Baker will handle metallurgical sales. George Lewis, up until recently production manager at the Mallory plant in Indianapolis, is also to handle metallurgical sales, contacting principally the tool shops in connection with special fixtures and contacts for welding machines. Ray Applegate, welding engineer, is available for consultation on customers' problems. Edwin Tomes will handle jobber sales on radio replacement parts, while Orville Miller will sell contacts and all Mallory products to electrical manufacturers.

The new space includes greatly enlarged office facilities, increased stock space for welding electrode materials and for standard contacts to be supplied to the automotive industries. Garage space within the building is provided for visitors and for pick-up delivery. Approximately 10,000 sq. ft. of floor space is provided.

## Less Load Tipping

because each spiral in a Wissco Conveyor Belt is hinged on to the crimped reinforcement member rather than on to another spiral. This not only gives the belt perfect freedom from jerking, but divides the areas between spirals into two small triangles, thus giving more points for support of product. Write today for complete information.

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**WISSCO**  
**CONVEYOR BELTS**

The entire plant of the Grigsby-Grunow Co., Chicago, manufacturer of radios, refrigerators, and tubes, will be sold at public auction June 16, 17 and 18. It consists of \$1,000,000 worth of plant machinery, equipment, fixtures and parts.

This action was decided upon by the present owners Walter Schott and Harris, Karp, Goldsmith Co., Inc., after three months of unsuccessful negotiation with other leaders in the radio and refrigerator field to reestablish the Grigsby-Grunow Co. as a going concern and put it back in production.

The Scullin Steel Co., St. Louis, has been authorized to spend \$20,235 to change its sand-blast equipment from the closed-door type to the par-blast type. The Parsons Engineering Co., Cleveland, is to install the equipment.

## Oglebay, Norton Buys Saginaw Dock

GLEBAY, NORTON & CO., Cleveland, have acquired and will operate the dock at Saginaw, Mich., that has been owned by the Peterson-Saginaw Terminal Co. and also has taken over the Peterson Steamship Co., which owned three freight boats. The two companies have been merged in a new corporation known as the Saginaw Dock & Terminal Co.

Officers of the new company are: Crispin Oglebay, chairman of the board; R. C. Allen, president; F. J. Peterson, vice-president; A. C. Bishop, secretary, and R. C. Norton, treasurer. Mr. Oglebay is president; Mr. Allen, first vice-president; Mr. Bishop, secretary, and Mr. Norton, treasurer of the Oglebay, Norton company. Mr. Peterson was the owner of the two Saginaw companies and has taken a financial interest in the new company.

Charles A. Alanova has been appointed manager of the Saginaw dock and terminal business.

## United States Share Of World Steel Off

STEEL production in the United States during the past five years has averaged only 34 per cent of world steel production, the American Iron and Steel Institute has estimated. Not since the five-year period ending 1897 has the steel industry in this country produced as small a proportion of total world output.

Between 1931 and 1935 a total of 122,600,000 tons of steel was produced in the United States, while 238,000,000 tons was produced in the other steel making countries of the world. In the preceding five-year period steel production in this country aggregated 48 per cent of the world output, 242,000,000 tons being produced here as against 270,000,000 tons elsewhere in the world.

From 1865, when only 3½ per cent of the total steel produced in the world was made in this country, to 1919 when 60 per cent was produced here, both the relative and the actual importance of the United States as a steel producing nation showed a general upward trend.

Since 1919, the trend of relative output has been generally downward, and even in 1929, the all-time peak of steel production in this country, only 48 per cent of

the world's output was made in the United States.

In 1932 the tonnage of steel produced in this country amounted to only 28 per cent of world production, the lowest proportion of total world output since 1888. In spite of the fact that steel production in the United States in 1935 was nearly 2½ times as large as production in 1932, only 35 per cent of world steel was made in this country.

## Combustion Data Given in New Book

FOR engineers and others concerned with the operation of furnaces, ovens and other processing equipment, the Hauck Mfg. Co., 126 Tenth Street, Brooklyn, N. Y., has issued a 62-page 8½ x 11 in. data book.

Entitled "Hauck Industrial Combustion Data," this book is an elaboration of a manual originally compiled for use by the company's engineers, and is intended to assist the user in the better understanding of heat processing and equipment. It is presented as a practical reference, with minimum of complex technical terms and theoretical discussion. Four pages of fundamental definitions are followed by a 29-page section devoted to data on oil burning, including descriptive data on the different Hauck Venturi burners and auxil-

iary equipment. Eight pages on gas burning also includes descriptions of some of the company's products. Some 18 pages are devoted to valuable general combustion data, conveniently arranged. These include thermal properties of solids, liquids, etc.; comparative thermal values of various fuels; comparative fuel costs; introconversion table for units of volume and weight, and for energy; and several pages of data relating to refractories. Copies are sent gratis to engineers interested in industrial heating processes writing on their business letter heads; to others, copies are obtainable at \$1 each, to cover cost of publication.

Effective May 26, 1936, the interests of the Charles Horewitz Estate in the Butler Iron & Steel Co. were acquired by Harry N. and Louis S. Cohn. The company will continue operations at its yard and offices, Negley Avenue, Butler, Pa., with the following officers and directors: Harry N. Cohn, president; Edward B. Davis, vice-president, and Louis S. Cohn, secretary-treasurer.

Whitman & Barnes, Inc., Detroit, has taken over the Buckeye Twist Drill Co., Alliance, Ohio, and this plant hereafter will be operated as the Buckeye Twist Drill Division of the Latrobe Tool Mfg. Co. There will be no change in the personnel.

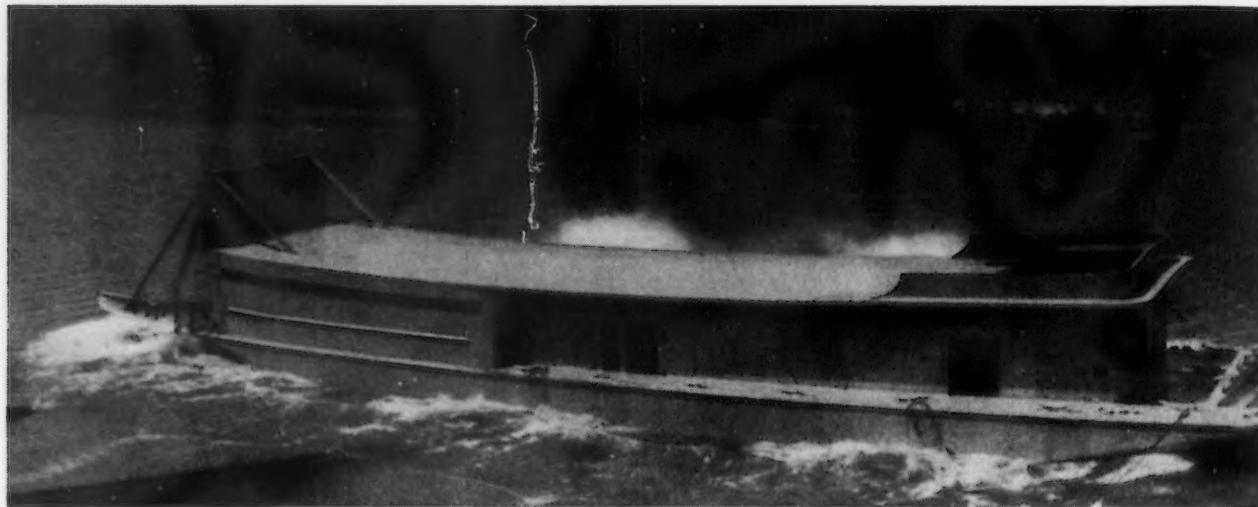
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## Pittsburgh Coal Is Modernizing Fleet

In line with a fleet modernization policy inaugurated last summer with the construction of the tow-boat "Champion Coal," the Pittsburgh Coal Co. has launched the "Ranger," newest addition to its fleet, at the Neville Island ways of the builder, the Dravo Corp. The new vessel is the first specially designed all-metal arc-welded steam, stern wheeler to be used on the western rivers. It will be used to

transport coal to large mill users at down-river points.

Dimensions of the new boats are: length of hull, 145 ft.; beams, 32 ft., and depth at the lowest point, 6 ft. 4 in. The new vessels are all steel up to and including the boiler deck. They have the usual flat bottom, scow bow and stern, and are fitted with a tripping skeg at the bow and hog trussing, sampson post and cylinder beams. The vessels have a sweep shear all fore and aft, with head raised well above the normal water line. The hull proper is divided into 13

water-tight compartments by means of transverse and longitudinal bulkheads.

Like the "Champion Coal," both the "Ranger" and the "Cruiser," now being completed, have greater strength, less weight and much greater freedom from minor leaks. These qualifications, in addition to having been duly approved by the various inspection bureaus, are in cooperation with the present drive being made by the Bureau of Navigation and the Steamboat Inspection Service for greater safety, stability and freeboard for vessels of this class.



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**J&L  
STEEL**

**JONES & LAUGHLIN STEEL CORPORATION**  
AMERICAN IRON AND STEEL WORKS  
PITTSBURGH, PENNSYLVANIA

## Republic Is Spending \$700,000 for Improvements

REPUBLIC STEEL CORP. has authorized appropriations totaling nearly \$700,000 for plant improvements and additional equipment. The largest single expenditure will be made in the Youngstown-Warren district where over \$250,000 will be spent in increasing the finishing capacity of the electric-weld tube mills. For minor improvements in Youngstown and Warren plants an additional \$65,000 will be spent.

Facilities for increased production of coated sheets in the Stark sheet mill at Canton and of stainless steel strip at Massillon will be made at a cost of \$206,000. For enlargements of the Buffalo open-hearth plant \$74,000 has been authorized. Additions and improvements to equipment in the Truscon plant in Cleveland will involve an expenditure of \$64,000. Minor improvements also have been authorized for the Steel & Tubes, Inc., plants in Cleveland and Elyria, for the blast furnace plant at Birmingham and at the northern ore mines.

## Carnegie-Illinois Completes Merger

**E**FFECTIVE June 1, American Sheet and Tin Plate Co. was merged with Carnegie Illinois Steel Corp., the consolidated company being known as the Carnegie-Illinois Steel Corp., with headquarters at Pittsburgh and Chicago.



B. F. FAIRLESS



F. C. HARPER



D. A. BARRETT

The officials of the new company are: B. F. Fairless, president; G. C. Kimball, executive vice-president at Chicago; L. H. Burnett, vice-president; C. V. McKaig, vice-president and general manager of sales; J. H. McKown, assistant vice-president and assistant general manager of sales; W. I. Howland, Jr., vice-president, Western sales, Chicago; J. W. Hamilton, secretary; F. C. Harper, treasurer; O. M. Havekotte, assistant treasurer at Pittsburgh; E. B. Harkness, assistant treasurer at Chicago; William Donald, comptroller; J. E. Lose, vice-president in charge

of operations; D. A. Barrett, vice-president; W. C. Oberg, manager of operations, Pittsburgh district; R. B. Saylor, assistant manager of operations, Pittsburgh district; Walther Mathesius, manager of operations, Chicago district; H. G. McIlvried, assistant manager of operations, Chicago district; C. F. W. Rys, chief metallurgical engineer; Sydney Dillon, chief engineer; J. A. Hagan, chief industrial engineer; C. R. Miller, Jr., purchasing agent at Pittsburgh; F. J. Rief, purchasing agent at Chicago, and Carroll Burton, vice-president, Lorain division.

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Chain drives gain increasing acceptance year by year as a means to profitable machine performance. The field of application for this positive and efficient power transmission medium has constantly widened, because modern chain drives have kept in step with improved manufacturing methods and materials.

Whitney Chain Drives are recognized as outstanding in performance. They have strength for the most severe operating conditions and a high resistance to wear, which helps to maintain original accuracy and smoothness of operation.

Whitney Chain Drives are specified by leading designers, manufacturers and plant engineers. Their inherent characteristics allow a freedom of design which is unequalled by other types of drives. Whitney engineers can offer valuable suggestions on your power transmission problems. Write today for further information.

The Whitney Chain & Mfg. Co., Hartford, Conn.



# Electric Furnaces and Their Part in Metallurgical Progress

(CONCLUDED FROM PAGE 35)

both chemically, physically and in its ultimate behavior, in an electric arc melting furnace.

The high frequency electric induction furnace lends itself naturally to a high degree of uniformity simply because the process is so limited that it cannot go far wrong. It is much like the crucible melting process in that a high degree of uniformity is virtually guaranteed by the very limitations of the process itself.

The arc furnace, on the other hand, is almost universal in its functions. It can make steel as bad as the worst or as good as the best, and everything in between. And like all such versatile equipment, it is a marvel in the hands of a skillful melter backed up by modern instruments and technical control. The versatility of the arc furnace has been emphasized because if a process can make a variable product at will it can make an unvariable product the same way. A golfer can really never be sure that he will hit a straight ball until he has learned to deliberately hit both slices and hooks.

## Steels Richer in Alloys

Open-earth furnaces will seldom be found melting steels containing more than about 5 per cent of total alloys. Yet engineering progress in combatting corrosion or in making automobile valves, high temperature equipment, electrical resistors, permanent magnets, high-speed tools, etc., call for ferrous materials that may contain from

10 to 50 per cent of alloys. In times gone by the crucible furnace was the only means of making the rich alloy steels, but it is now no longer necessary to depend upon the relatively expensive and limited possibilities of the crucible process for our supply of such alloys.

Large percentages of alloys can be added directly to the electric melting furnace with comparatively little loss. Such heavy additions to the ladle would be impracticable or impossible but they are only every-day routine under the reducing atmosphere of the electric furnace.

The abilities of the electric furnace along this line have gradually broken down certain very practical and understandable prejudices in the steel maker's mind. Some steel mills have hardly yet lost the habit of looking at a complicated analysis containing 20 per cent, or 50 per cent, or even more alloying elements and saying, "We are steel makers, we can't quote on that." Yet we find many steelmakers today making metals containing as much as 85 per cent alloy and only 15 per cent iron—and are glad for the opportunity. This change of viewpoint is a direct reflection of the ease with which the electric furnace lends itself to such melting. It is not to be assumed that there are not difficult problems to solve in connection with making many of these rich alloys—but the fact remains that it can be, and is being, done.

The contribution of electric furnaces to the making of alloy-

rich steels is not limited to their ability to make them in large quantities. The fact that this process can economically remelt the scrap from these same alloys is in itself an important contribution. For example, high-chromium, corrosion resisting steel scrap is most unwelcome in an open hearth charge. Not only is the chromium lost by oxidation, but its oxides are so objectionable in the slag that its value is something less than nothing. Under the reducing atmosphere of the electric furnace, however, these high alloys can be saved and have a definite economic value.

Still another related advantage of the electric arc furnace is its ability to derive alloys direct from their ores. This has been done with tungsten, vanadium, molybdenum and others, but the one likely to become most important is chromium. It is entirely practicable to make corrosion resisting steels containing, for example, 18 per cent chromium by reducing chrome ore in the steel-making slag so that the metallic chromium is assimilated direct by the bath. A very interesting manipulation recently proposed is to feed the alloy ores into the bath through hollow electrodes.

And finally, a word must be said regarding the contribution of the electric furnace to improvements in ferro-alloys. These are the raw materials which the steel maker uses for making alloy additions to his steel—ferro-tungsten, ferro-silicon, ferro-chromium, etc. Although the improvements were not achieved by the steel maker, it is definitely an accomplishment of the electric furnace—and it has enough bearing upon our subject to warrant brief mention.

## HY-TEN "A" TEMPER NO. 1X ANALYSIS .20 CARBON-MN-MO ALLOY STEEL

A free machining carburizing steel of controlled grain size suitable for gears, worms, clutches, chuck jaws, cams, forming rolls, spindles, etc., which responds with excellent results to single or double treatment.

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**WHEELOCK, LOVEJOY & COMPANY, INC.**

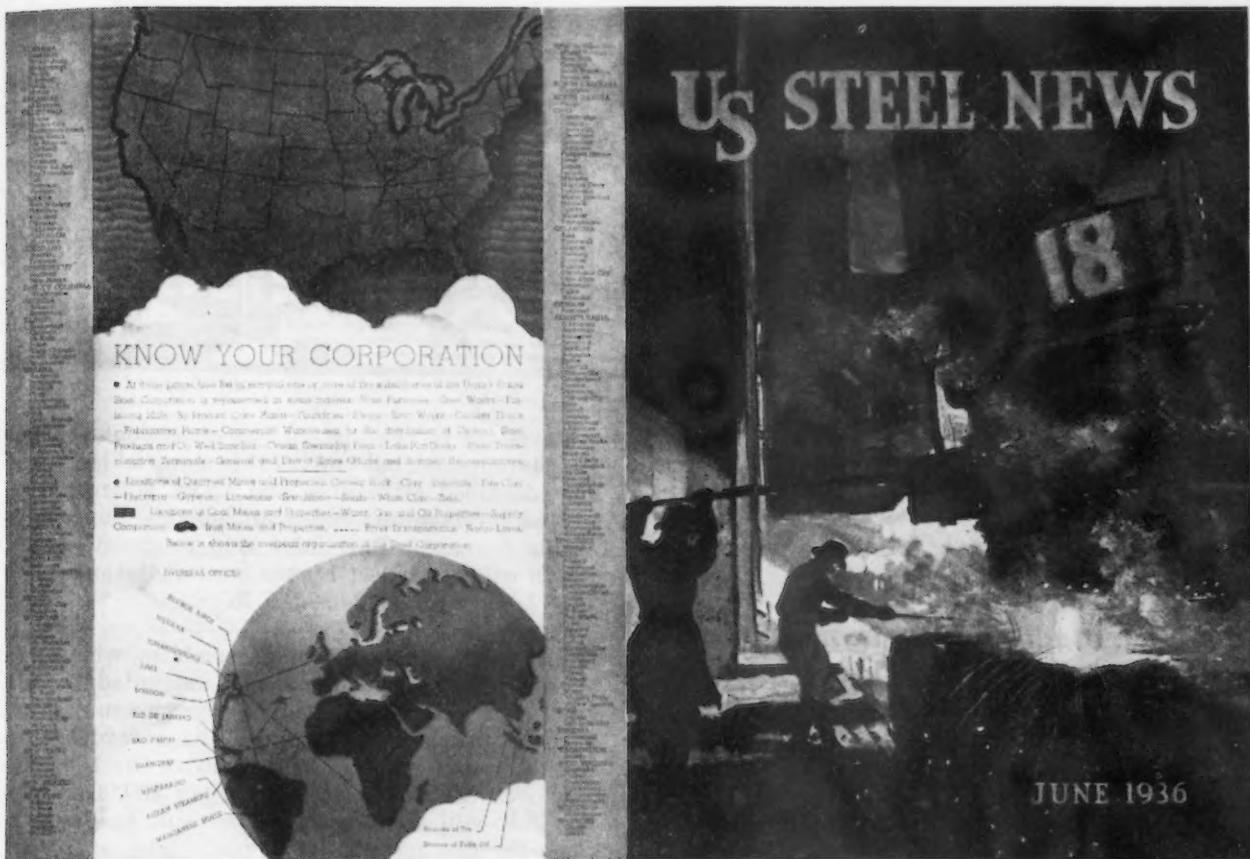
CAMBRIDGE

CLEVELAND

CHICAGO

NEWARK

DETROIT



## Steel Corporation's New Employee Magazine Establishes High Standard

SETTING a new high standard in the employee magazine field, the *U. S. Steel News* made its first monthly appearance on June 1. Of the first issue, 233,000 copies were printed for distribution among all the employees and pensioners of the world's largest steel company.

Under the editorship of G. L. Lacher, formerly managing editor of *THE IRON AGE*, the *U. S. Steel News* has been carefully planned to provide a maximum of reader interest. Its format is exceptionally pleasing and the 24 pages of editorial material contained within its decorative covers can scarcely fail to attract the attention of the mill worker as well as of the executive.

The purpose of the new publication is explained in a letter to all company employees from Myron C. Taylor, chairman of the board of the Steel corporation, which introduces the *U. S. Steel News*. It should, says Mr. Taylor, "help each

of us get a clearer picture of the different activities of the companies that make up the Steel corporation. Ours is a large organization, with interests reaching the far corners of the earth. Its success—in fact, the success of all of us—depends on the combined efforts of all Steel corporation companies. And what they accomplish depends largely on how well each man handles his own job. This is true whether we are employed in mining, quarrying, manufacturing, fabricating, warehousing or transportation.

"The magazine," the letter continues, "should be of value to us individually and as an organization. It will give us a better idea of what all parts of the corporation are doing to promote our interests. It will familiarize us with what is being done to improve the quality of our products and to increase our sales. It will acquaint us with the

aims and policies of the organization as a whole."

Of particular interest in the first issue is a brief review of the history of the Steel corporation since its founding in 1901. This is to be followed in the July number with a discussion of the corporation's plans for the future.

Other features of particular interest to employees are concerned with the remarkable recovery from the Pittsburgh flood which was accomplished through the cooperation of the workers; the visit of the Joliet, Ill., Township High School band to the headquarters of the corporation at 71 Broadway, and the get-together of the Clairton, Pa., "Old Timers" for medal presentation.

The front cover of the publication is of unusual interest. Beautifully printed in color, it shows the pouring of the steel ingot. The back cover locates by means of colored maps the various places in the United States and in the world in which the Steel corporation does business. The two covers are reproduced above, but their full force can hardly be appreciated without the use of color.



## SUMMARY OF THE WEEK

**... Pig iron production rises  $6\frac{1}{2}$  per cent, establishing six-year record.**

• • •

**... Steel ingot output is maintained at 68 per cent of capacity for second week.**

• • •

**... Little anticipatory buying is reported as third quarter prices are announced on practically all products.**

WITHOUT the benefit of much buying in anticipation of higher third quarter prices, steel demand is sufficient to maintain ingot production at 68 per cent of capacity. The trend even appears to be upward, and it is likely that the placing of heavy tonnage for June shipment at the current prices will force output above the 70 per cent level this month.

May pig iron production rose to 85,432 tons daily, a gain of 6.6 per cent over April's rate of 80,123 tons, and establishing a new six-year record. Total output was 2,648,401 tons, compared with 2,403,683 tons in April. Five stacks went into blast last month and two were taken off. The 147 active stacks on June 1 were making iron at a rate of 86,385 tons daily.

Pig iron prices have been reaffirmed for the third quarter, but scarcely any forward contracting is reported. Importations of foreign iron are increasing on the Atlantic Seaboard, and many users who do not have established sources of supply are taking advantage of the low prices offered. THE IRON AGE composite price of pig iron is unchanged at \$18.84 a gross ton.

STEEL price advances, in addition to those announced last week, include steel sheet piling and bolts and nuts. Contrary to early reports, cold-rolled strip will not be raised, nor will wire products. No changes in rail and track accessory prices are expected before the fourth quarter, and discounts on tubular goods will not be altered.

Revisions in reinforcing bar quotations are not now anticipated, but most of this material is bought for identified structures and strict adherence to quoted levels would mean an advance on considerable tonnage. THE IRON AGE composite price, which will not reflect higher steel quotations until July 1, remains at 2.097c. a lb.

THE decline in automobile assemblies, which was rather sharp two weeks ago, amounted to only 1500 cars last week. During the current period a more pronounced drop will be recorded, but weekly output will still be well above the 100,000-car level. June assemblies will top 400,000 units, but July will see drastic curtailment as preparations for new models are begun.

All of the steel required for production of 1936 models is expected to have been purchased by June 15, and not more than a month will be needed to complete shipments. It is possible that motor car makers will stock steel this month against price advances, but not many of them have established their new models' needs accurately.

ORDERS from the railroads have been light recently, but specifications from the car builders are heavy and will continue through the summer. A secondary rail-buying movement is still anticipated. The Birmingham and Colorado mills are approaching the end of their runs, but the Chicago capacity will be operated at 50 per cent through July.

Fabricated structural steel lettings are higher at 20,350 tons, compared with 11,900 tons last week, but new projects have declined from 27,400 tons to 11,800 tons. However, a number of large jobs will soon be out for bids. New schools in New York will take 25,000 tons and two sections of the West Side elevated highway in Manhattan will require 12,000 tons.

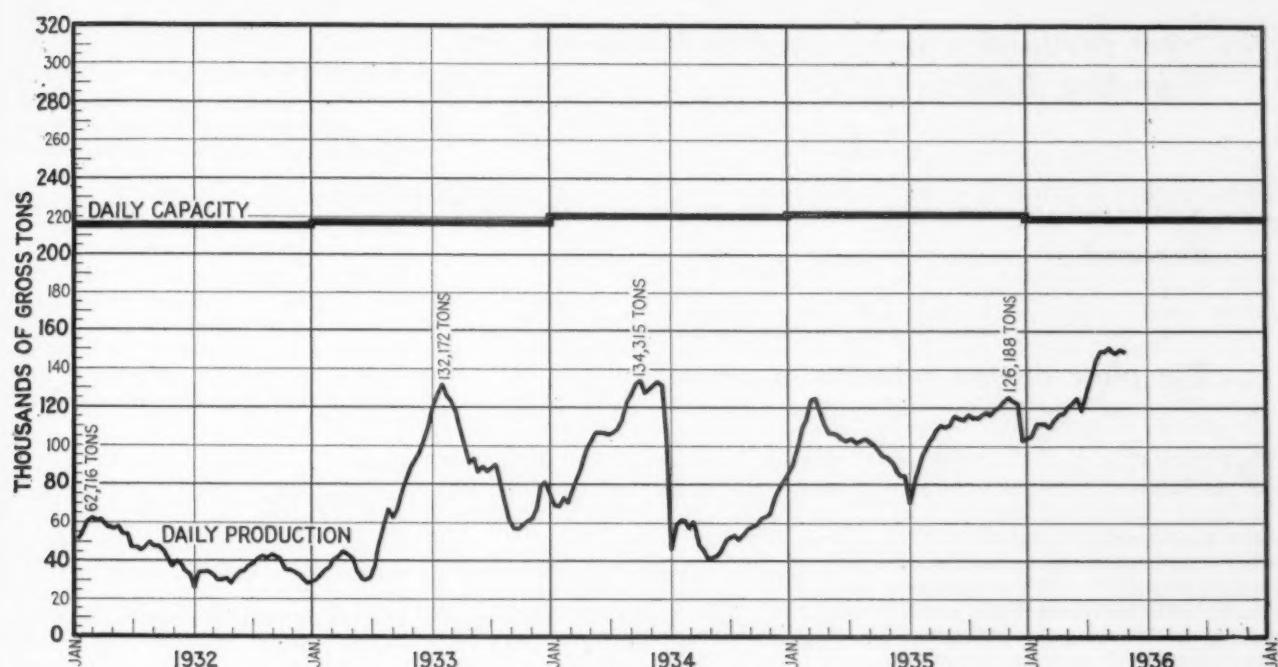
THE scrap market is quiescent. THE IRON AGE composite price has declined for the fifth consecutive week and now stands at \$12.92 a gross ton. Consumption is at a high rate, but the supply of scrap is large and offerings are exceeding melting requirements in some districts.

Coincident with higher steel prices in this country, British makers have advanced quotations \$1 to \$4 a ton. Pig iron is also being increased. Demand for steel in the United Kingdom has taxed capacity severely for several months and a number of new plants are under construction.

## STEEL INGOT PRODUCTION

Daily Tonnage of Bessemer and Open-Hearth Steel Ingots Produced by Weeks, 1932-1936

Current Week	Last Week	June 8, 1935	June 9, 1934	Weeks Ended
149,241	149,241	91,873	132,113	June 10, 1933
				93,171
				June 11, 1932
				40,008



### STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

District	Current Week	Last Week	May 9, 1936	Weeks Ended
			June 8, 1935	June 9, 1934
Pittsburgh .....	63.0	63.0	63.0	34.0
Chicago .....	67.0	65.0	67.0	43.5
Valleys .....	71.0	74.0	73.0	48.0
Philadelphia .....	44.0	44.0	45.0	32.0
Cleveland .....	77.0	72.0	76.0	45.0
Buffalo .....	80.0	76.0	66.0	41.0
Wheeling .....	90.0	90.0	90.0	63.0
Southern .....	67.0	67.0	67.0	50.0
Ohio River .....	80.5	77.0	85.0	60.0
Western .....	77.5	77.5	80.0	30.0
St. Louis .....	81.0	82.0	80.0	21.0
Detroit .....	100.0	100.0	100.0	95.0
Eastern .....	85.0	85.0	90.0	35.0
Aggregate .....	68.0	68.0	68.0	41.5
Average Year to Date	59.4	59.0	57.6	47.5

## Weekly Booking of Construction Steel

FROM THE IRON AGE

	Week Ended				Year to Date	
	June 2, 1936	May 26, 1936	May 5, 1936	June 4, 1935	1936	1935
Fabricated structural steel awards.....	20,350	11,900	14,400	5,700	448,070	325,400
Fabricated plate awards.....	1,000	550	5,360	5,600	113,960	76,850
Steel sheet piling awards.....	0	0	145	0	16,975	23,945
Reinforcing bar awards.....	4,100	5,760	5,455	2,455	160,590	113,325
Total Lettings of Construction Steel....	25,450	18,210	25,360	13,755	739,595	539,520



*... Steel production maintained in Pittsburgh and Wheeling districts.*

• • •

*... Anticipatory buying not yet a factor in steel demand.*

• • •

*... Tin plate output remains at capacity.*

PITTSBURGH, June 2.—With the majority of price increases for third quarter delivery having been announced, producers in this district are watching to see the effect on production this month, since buyers will no doubt book anticipatory orders to gain the advantage of second quarter prices.

There has not been much evidence of anticipatory buying this week, although the fact that the Pittsburgh district continues to run at 63 per cent may in some measure be attributable to some forward purchasing. The Wheeling district remains at 90 per cent, there being no change from last week.

While no announcements have been made regarding tubular product prices, it is the opinion that present discounts will be the rule for third quarter delivery. Demand this week for semi-finished steel remains at recent levels, with a good probability of further improvement, since non-integrated mills will want to take advantage of present prices.

Persistence on the part of consumers to specify heavily for hot-rolled bars continues with mills still behind in shipments. This condition will probably be accentuated as the month goes on. Sources of demand are well diversified, no one of them being outstanding.

Prices on bolts and nuts will be up 5 per cent for the third quarter, with some announcement due within a week or so on large and small rivets. These producers are experiencing the best business for quite some time, and there is no

indication of a drastic drop, as miscellaneous demand seems to fill the temporary absence of automobile buying.

Nothing outstanding has developed in the reinforcing bar business, as prices have not been announced as yet. However, due to the unsettled conditions in this field, it is not expected that present prices will be increased for third quarter. The cold-finished business during May closely approximated that of March, which was one of the best months since 1930, and, while new specifications have dropped, shipments are continuing at a good rate. It is felt by producers that the falling off in orders is due in a large part to customers withholding bookings until they assimilate the new price policy for third quarter.

Demand for plates and shapes shows no change from recent levels, while the same may be said for tubular products. In the light finished category, sheet production this week shows an increase over the past week, due in some measure to automobile manufacturers cleaning up on old models. This tendency is also discernible in strip production.

Tin plate production, on the other hand, remains at full capacity, with shipments overtaking production, resulting in further depletion of stocks on hand. Combined with packers' requirements is a healthy volume of orders from general line can manufacturers, and makers of beer cans.

There have been no outstanding developments in the raw materials

markets, prices for pig iron having been reaffirmed.

#### **Pig Iron**

Pig iron prices have been reaffirmed for third quarter shipment. No unusual activity is present in this market, specifications and shipments continuing at recent rates. Another steel-making stack has been blown in in the Valleys, which brings the number of active blast furnaces in the district to the highest point since 1930.

#### **Semi-Finished Steel**

It is too early yet to determine the exact effect of the recent price increases on specifications for semi-finished steel, although producers feel that this month will see no falling off along present levels, and a good possibility of an increase in bookings. One of the changes in size extras on forging quality billets was a reduction from \$4 to \$2 a ton on billets under 5 x 5 in. to 4 x 4 in., making this extra the same as has prevailed on 5 x 5 in. to 6 x 6 in. billets.

#### **Bars**

Demand for hot-rolled bars persists, with the mills still further behind on shipments. Producers have endeavored to impress consumers with the importance of anticipating their demands if they expect to get prompt shipments. Sources of demand continue to be well diversified, although buying by the automotive people has in recent weeks leveled off sharply. Quite some support is coming from railroad car builders and bolt and nut people. Producers expect a rush of orders some time this month in order to gain advantage of second quarter prices before the \$2 increase goes into effect on July 1.

#### **Bolts, Nuts and Rivets**

Demand from miscellaneous sources and railroad car builders is responsible for a fairly satisfactory production rate. Although automotive people are practically out of the market, it is expected that they will start specifying soon for new models. Prices for third quarter delivery on bolts and nuts have been advanced 5 per cent. Quotations for small and large rivets have not yet been announced, but will be forthcoming in about a week.

#### **Steel Sheet Piling**

Prices for third quarter delivery on steel sheet piling will be \$2 higher than second quarter quotations. Meanwhile demand is dull, with no outstanding jobs having been placed during the past week. The United States Engineer Office at Canal Point, Fla., is inquiring

# A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous:  
Advances Over Past Week in Heavy Type, Declines in Italics

## Rails and Semi-finished

	June 2, 1936	May 26, 1936	May 5, 1936	June 4, 1935
Per Gross Ton:				
Rails, heavy, at mill.....	\$36.37 1/2	\$36.37 1/2	\$36.37 1/2	\$36.37 1/2
Light rails, Pittsburgh.....	35.00	35.00	35.00	35.00
Rerolling billets, Pittsburgh.....	28.00	28.00	28.00	27.00
Sheet bars, Pittsburgh.....	28.00	28.00	28.00	28.00
Slabs, Pittsburgh.....	28.00	28.00	28.00	27.00
Forging billets, Pittsburgh.....	35.00	35.00	35.00	32.00
Wire rods, Nos. 4 and 5, P'gh.....	38.00	38.00	38.00	38.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.....	1.80	1.80	1.80	1.70

## Finished Steel

	Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.85	1.85	1.85	1.80	
Bars, Chicago.....	1.90	1.90	1.90	1.85	
Bars, Cleveland.....	1.90	1.90	1.90	1.85	
Bars, New York.....	2.20	2.20	2.20	2.15	
Plates, Pittsburgh.....	1.80	1.80	1.80	1.80	
Plates, Chicago.....	1.85	1.85	1.85	1.85	
Plates, New York.....	2.09	2.09	2.09	2.09	
Structural shapes, Pittsburgh.....	1.80	1.80	1.80	1.80	
Structural shapes, Chicago.....	1.85	1.85	1.85	1.85	
Structural shapes, New York.....	2.06 1/4	2.06 1/4	2.06 1/4	2.06 1/4	
Cold-finished bars, Pittsburgh.....	2.10	2.10	2.10	1.95	
Hot-rolled strips, Pittsburgh.....	1.85	1.85	1.85	1.85	
Cold-rolled strips, Pittsburgh.....	2.60	2.60	2.60	2.60	
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	2.40	2.40	2.40	2.40	
Hot-rolled annealed sheets, No. 24, Gary.....	2.50	2.50	2.50	2.50	
Sheets, galv. No. 24, P'gh.....	3.10	3.10	3.10	3.10	
Sheets, galv., No. 24, Gary.....	3.20	3.20	3.20	3.20	
Hot-rolled sheets, No. 10, P'gh.....	1.85	1.85	1.85	1.85	
Hot-rolled sheets, No. 10, Gary.....	1.95	1.95	1.95	1.95	
Cold-rolled sheets, No. 20, Pittsburgh.....	2.95	2.95	2.95	2.95	
Cold-rolled sheets, No. 20, Gary.....	3.05	3.05	3.05	3.05	
Wire nails, Pittsburgh.....	2.10	2.10	2.10	2.60	
Wire nails, Chicago dist. mill.....	2.15	2.15	2.15	2.65	
Plain wire, Pittsburgh.....	2.40	2.40	2.40	2.30	
Plain wire, Chicago dist. mill.....	2.45	2.45	2.45	2.35	
Barbed wire, galv., Pittsburgh.....	2.60	2.60	2.60	3.00	
Barbed wire, galv., Chicago dist. mill.....	2.65	2.65	2.65	3.05	
Tin plate, 100 lb. box, P'gh.....	\$5.25	\$5.25	\$5.25	\$5.25	

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

## The Iron Age Composite Prices

### Finished Steel

June 2, 1936  
One week ago  
One month ago  
One year ago

2.097c. a Lb.  
2.097c.  
2.097c.  
2.124c.

Based on steel bars, beams, tank plates, wire rails, black pipe, sheets and hot-rolled strips. These products represent 85 per cent of the United States output.

### Pig Iron

\$18.84 a Gross Ton  
18.84  
18.84  
17.84

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

### Steel Scrap

\$12.92 a Gross Ton  
13.08  
13.83  
10.83

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	HIGH	LOW
1936.....	2.130c., Jan. 7;	2.084c., Mar. 10
1935.....	2.130c., Oct. 1;	2.124c., Jan. 8
1934.....	2.199c., April 24;	2.008c., Jan. 2
1933.....	2.015c., Oct. 3;	1.867c., April 18
1932.....	1.977c., Oct. 4;	1.926c., Feb. 2
1931.....	2.037c., Jan. 13;	1.945c., Dec. 29
1930.....	2.273c., Jan. 7;	2.018c., Dec. 9
1929.....	2.317c., April 2;	2.273c., Oct. 29
1928.....	2.286c., Dec. 11;	2.217c., July 17
1927.....	2.402c., Jan. 4;	2.212c., Nov. 1

	HIGH	LOW
	\$18.84, Jan. 7;	\$18.84, Jan. 7
	18.84, Nov. 5;	17.83, May 14
	17.90, May 1;	16.90, Jan. 27
	16.90, Dec. 5;	13.56, Jan. 3
	14.81, Jan. 5;	13.56, Dec. 6
	15.90, Jan. 6;	14.79, Dec. 15
	18.21, Jan. 7;	15.90, Dec. 16
	18.71, May 14;	18.21, Dec. 17
	18.59, Nov. 27;	17.04, July 24
	19.71, Jan. 4;	17.54, Nov. 1

	HIGH	LOW
	\$14.75, Feb. 25;	\$12.92, June 2
	13.42, Dec. 10;	10.33, April 23
	13.00, Mar. 13;	9.50, Sept. 25
	12.25, Aug. 8;	6.75, Jan. 3
	8.50, Jan. 12;	6.43, July 5
	11.33, Jan. 6;	8.50, Dec. 29
	15.00, Feb. 18;	11.25, Dec. 9
	17.58, Jan. 29;	14.08, Dec. 3
	16.50, Dec. 31;	13.08, July 2
	15.25, Jan. 11;	13.08, Nov. 22

for 85 tons of piling to be used during the construction of a bridge at Santos, Fla.

### Reinforcing Steel

Mills continue to be pushed for material being shipped on specific jobs. This situation shows signs of extending for the next month or so. While prices have not been announced as yet for third quarter delivery on new business, there are indications that present quotations will be reaffirmed. It would seem to be the intention of the mills to have present quotations well tested before any attempt is made to change the price structure.

### Cold-Finished Bars

Demand for cold-finished bars during May was much better than during April, and closely approximated March, which month exceeded any since 1930. Demand over the past week has eased off slightly, due to the almost total absence of new specifications from automotive people. There is an apparent tendency on their part to stay out of the market for a short time in order to determine whether the mills mean "business" on their recent price increases. Producers here are definite in the fact that consumers must specify during the month of June if they expect to take advantage of present prices. It is generally expected that customers will be able to take shipments during the month of July. Meanwhile demand from miscellaneous sources, such as household appliances, continues at a good rate.

### Plates and Shapes

Demand for plates and shapes continues along recent levels, with no apparent let-up. It is expected by producers that the increased price for third quarter delivery will bring about some anticipatory buying during June.

Meanwhile structural awards this week were larger in number than previously reported. Over half of the projects were for material to be used in highway bridges, while the outstanding project was for a medical building in Jersey City, taking 2975 tons. Private projects were further represented by the awarding of contracts for 1100 tons to be used for two factory buildings for the Celanese Corp. at Amcille, Md. Structural inquiries were about evenly divided between public and private projects. During recent weeks there has been a definite tendency toward greater activity on private projects, which is encouraging to producers, as this

type of construction has been sadly missing in the past.

### Tubular Products

As yet prices for tubular goods have not been announced, although the opinion seems to be that no increases are indicated for third quarter shipment. Demand for oil-country goods is running at recent levels, and producers do not take seriously the rumors of oil drilling curtailment. Demand and movement of standard pipe are about the same as previously reported, while orders for industrial boiler tubes are quite satisfactory. No new line pipe projects are in evidence, and the trade is still awaiting the allocation of the Shell line pipe order.

### Wire Products

Demand for merchant wire products continues dull, and bookings for manufacturing wire are slightly off, due to the absence of orders from the automotive people. Second quarter prices have been reaffirmed for third quarter delivery. This action was more or less expected, since recent second quarter increases have not had a real test, and the market for those products in which prices were reduced in the second quarter has been unsettled in some locations.

### Sheets

Specifications for sheets over the past week have shown an increase. Some part of this came from automotive makers for cleaning up on old models, while producers feel there was a slight tendency on the part of miscellaneous buyers to begin anticipatory purchases. As a result sheet production this week is up to approximately 65 per cent of capacity, compared with 63 per cent last week. The next few weeks will determine to what extent buyers will take advantage of second quarter quotations.

### Tin Plate

Insistent demand for packers' specifications, coupled with good crop outlooks, is responsible for tin plate production remaining at practical capacity this week. In addition to packers' requirements, makers of oil cans persist in their efforts to have materials shipped as soon as possible, due to heavy demand for this product. Shipments of tin plate are gaining over production, with the result that stocks are being depleted at a better rate than last week. This tendency will be accentuated in the future.

### Strip Steel

While quotations for hot-rolled strip for third quarter shipment

were increased \$2 a ton, no action has been taken as yet on cold-rolled strip. Opinion seems to indicate no change in cold-rolled strip prices for the third quarter. Meanwhile, specifications are slightly better this week, due to demand from miscellaneous sources, and a slight increase in bookings from automobile people, who are cleaning up on old models. No definite effects of the increase in hot-rolled strip, as far as anticipatory buying is concerned, have been noted as yet. Nevertheless producers expect heavy specifying before the end of this month.

### Coal and Coke

Movement of industrial coke remains at recent levels, with the interest in new specifications subsiding somewhat. Both production and shipment of blast furnace coke during the past month showed an increase over April. Shipments of coal from this district to the Lakes have increased slightly over the past week, and this tendency will be in evidence during the remainder of the season. Some buyers are withholding their commitments until after the decision has been reached on whether the emergency freight rates will be retained. This question must be settled by June 30, since at that time the rates would automatically be dropped unless a new order to retain them is issued.

## Allegheny Merger To Be Voted July 27

NEW special meetings of stockholders of Allegheny Steel Co. and West Leechburg Steel Co. have been called for July 27 to act upon a plan of merger of the two concerns. The joint plan of merger and reorganization has been revised, but the terms of exchange remain the same as in the original plan.

The latest agreement shows that Allegheny Steel has increased its outstanding common stock from 612,785 shares to 613,785 shares, the additional 1000 shares being issued to certain employees as additional compensation under contracts. The new agreement also provides that while the board of the surviving corporation shall consist of 11 directors, seven of them shall be the present directors of Allegheny Steel, and the additional four shall be elected by such present seven directors to serve until the next stockholders' meeting for the election of directors.

# CHICAGO



**... Ingot output regains last week's loss and is again at 67 per cent.**

• • •

**... Automotive and farm implement requirements are lessened.**

• • •

**... Construction activity continues to rise.**

**C**HICAGO, June 2.—June has already given some evidence of the improvement predicted for it. Specifications are up. Mills have regained the two-point loss registered a week ago and again are at 67 per cent.

Sales are off moderately, but a pick-up is in prospect. Consumers have been making inquiry regarding deliveries of tonnages which they might buy on a spot basis. Insofar as they would be influenced by price increases pending for the third quarter, these prospective purchases would be speculative, but those consumers who have definite programs know what their requirements will be.

Contract demand from the automotive industry has not diminished, despite the slowing down in assemblies, yet a decline is due shortly for seasonal reasons. The same is true as to the farm implement industry, and the letting down in implement production indicates the period of heavy output by that consumer is nearing a close.

A fair volume of orders is reported for both alloy and semi-finished steels. The alloy demand applies to both bars and sheets. Plate orders have increased. A larger demand for outdoor construction, including river work, bridge building, power projects and oil industry construction has followed a slightly better volume from car builders and boiler makers. Structural specifications also have gained. While sales are mildly lower, the field is developing and the pending price advances are expected to drive in some new business.

## Pig Iron

Increased construction, particularly home building, is partly re-

sponsible for the larger tonnage shipped in May compared with April. Demand has come through the medium of manufacturers of plumbing, sanitary ware and various other household appliances and equipment including stoves and radiation fixtures. This business, however, provided only a narrow strip of the total, virtually all consumers having been in the market. Despite the decline in automotive tonnages, leading interests report a consistently good demand from makers of castings for that line of production, while orders for tractor needs have not yet diminished. Demand exclusively for farm implement usage has receded. The industry in this territory has no definite views as to what effect the increase in third quarter steel prices will have on business in pig iron and foundry coke, but looks for a corresponding stimulation. This, however, will be indirect since there has been no intimation of a price rise in either commodity. Virtually all of the takings in the last month were for immediate consumption. This was indicated by the fact that shipments of coke, which usually represent the measure of the foundry melt, were in normal relationship with pig iron deliveries.

## Cast Iron Pipe

Makers of this commodity report operations at 60 per cent with orders coming in at a good rate from contractors who are now starting work on WPA projects that were let to contract last fall. Additional tonnage is being provided by small projects in the category of private enterprise. James B. Clow & Sons have booked approximately 1000 tons of 30-in.

pipe for Evanston, Ill. About 500 tons of pipe in varying sizes is soon to be ordered by the water-works department at Milwaukee, and equally as much tonnage is expected to come from various other projects in that vicinity. Makers look for an active demand this month as well as a fair degree of support for operations during the summer. The latter is virtually assured by the advance showing of expanding activity during that period.

## Wire Products

A sagging tendency was registered in this market during the last month. Normally this is expected to continue through June and July, but price advances thought possible for the third quarter may reverse the order to some degree and thus stimulate covering activity by consumers at the existing lower prices. While mills report fair-sized backlogs, these as well as specifications against them are dwindling gradually. The decline in demand of both manufacturing and rural consumers is purely seasonal.

## Rails

A temporary lull has settled over this market, particularly as to new business. Prospects for renewed activity, however, have been enhanced by the influence of the price factor. While no announcement has been made as to prices on railroad material in finished form, it is expected that some action will be taken, at least for application to the fourth quarter. Under existing contracts upon which the financing was based, mills have until September to ship railroad material bought at present prices. The assumption is that these prices will be reaffirmed for the third quarter. Most railroad orders, aside from those for car building, coming to this area are for miscellaneous items. Shipping orders for track accessories involve about 1000 tons. Rail units will continue to operate above 50 per cent of capacity through the summer. Support is guaranteed by backlogs.

## Plates

Demand is coming from all classes of construction. Liberal specifications from freight car builders have been supplemented by orders from boiler makers. The total of specifications is up, but new sales are off mildly. A considerable tonnage for bridge building is called for. A fair tonnage is involved in steel requirements of 1000 tons for Lock No. 24 on the

Mississippi River at Clarksville, Mo. Prospective business includes a part of the total requirements of penstocks for the Loup River power project, amounting to 900 tons, and also some of the 9250 tons involved in an inquiry for the Stone Canyon pipe line at Los Angeles.

### Structural Steel

Specifications have increased, but new sales are off. The major portion of the tonnage demand represents Federal projects, such as bridge and river construction work. Some anticipatory buying, influenced by the pending price increases, is expected to raise the total of business this month. Inquiries, including prospective plate orders received here, total 21,175 tons, and new awards, 6125 tons.

### Bars

Tonnage holds at about the same level as it has for the last three weeks, both as to sales and specifications. Demand from automotive interests under contract has not diminished despite the decline in assemblies, although some recession can be expected shortly for normal reasons. At the same time the possible stimulation to buying resulting from the third quarter price increases may hold demand at the current high level. A similar situation prevails as to orders from the farm implement industry. Implement output is down seasonally, but tractor production still is holding at the previous high average.

### Sheets

Contract demand for flat-rolled products, including sheets and strip, is well sustained. Improvement in miscellaneous demand has manifested itself, representing new purchases for delivery this month in anticipation of the proposed price advances. Some speculative buying is expected from the automotive industry, but this largely will be gauged by possible known requirements, especially by those companies which finally have decided upon a design for their new models.

### Reinforcing Bars

Gradual expansion in the construction field, particularly work on heavy engineering projects, is being reflected in an improved reinforcing demand, although this continues to be spotty, especially as to large orders. The largest demand from any one, or single group of sources, is that for highway bridges and road building projects. Some private work also

is coming to light. Makers are not at all concerned with the outlook. Pending requirements include those of the previously mentioned Outer Drive bridge development. Liberal specifications against existing backlogs are being amplified by spot orders from various sources.



... Steel demand continues steady.

• •

... Capacity additions going forward.

carrying sufficient stocks to take care of immediate needs. Current sales are entirely for spot delivery and consist of lots of 50 to 200 tons. A few melters have placed contracts for second quarter delivery and are taking schedule shipments against contract. Awards for the week were around 900 tons. Sales chiefly were in foundry iron with odd lot sales of malleable and no demand for basic. Pig iron production is holding around 58,000 tons monthly, with four stacks blowing and two banked. Prices are firm and unchanged.



... Plates and shapes active.

• •

... Steel mill activity is highest since 1930.

ST. LOUIS, June 2.—The announced increase of \$2 a ton on most finished steel products, effective July 1, has had the effect of stimulating some business, especially in view of the slowness of delivery by the mills because of heavy order files. Bars, shapes and plates have been moving well. Fencing and other wire products are slowing up in some dry sections, as farmers, fearing drought, hesitate to spend money for improvements. May warehouse business was slightly better than April, although containing fewer working days.

The State of Texas will open bids today for various highway bridges, requiring 2500 tons of structurals. Missouri will take bids Thursday for a bridge in Benton County to require 500 tons of shapes. Oklahoma will open bids today for a highway bridge requiring 700 tons of structurals. The Laclede Gas Light Co. will utilize 500 tons of plates for repair work on a gas tank in St. Louis.

Shipments of pig iron are being well maintained, because of the heavy melt in the district. Melters have been buying as the iron was needed. Activities in steel mills in the district, according to the Federal Reserve Bank of St. Louis, are at the highest rate since early 1930, which it attributes to increased orders for steel castings from railroads.

## PIPE LINES

**United States Engineer Office**, First District, New York, closes bids June 9 for six 5-ft. and six 2-ft. lengths of 8-in. steel pipe, with steel ell, flanges, bolts, etc.; also for 540 ft. of 8-in. black steel pipe, second-hand, for Waterbury, Vt. (Circular 445).

**United States Engineer Office**, Second District, New Orleans, asks bids until June 8 for 40 sections of 20-in. inside diameter steel pontoon pipe, each section 50 ft. long, and for 80 steel dredge pontoons, 22 ft. 11½ in. long (Circular 570).

**United States Engineer Office**, Jacksonville, Fla., closes bids June 9 for 10 steel pontoon pipes, 12.76-in. outside diameter, each 40 ft. long (Circular 314).

**White Eagle Oil Corp.**, Federal Reserve Bank Building, Kansas City, a division of Socony-Vacuum Oil Co., Inc., 26 Broadway, New York, has authorized new 6-in. welded steel pipe line from oil refinery at Augusta, Kan., to Kansas City, Kan., and vicinity, by way of Topeka, Kan., 178 miles, for gasoline transmission. Pumping plants will be located at points along route for booster service. Cost about \$5,000,000. R. R. Irwin is president of first noted company.

**Humble Pipe Line Co.**, Humble Building, Houston, Tex., plans new welded steel crude oil pipe line from present terminus at Mexia, Tex., to new Talco, Tex., oil field district, Titus and Franklin counties, about 140 miles. Surveys for steel pipe line gathering system in oil field area are in progress. Pumping plants will be built at points along route of main pipe line for booster service. Entire project will cost close to \$5,000,000. Company is affiliated with Humble Oil & Refining Co., first noted address.

**United States Engineer Office**, Navy Building, Washington, asks bids until June 12 for 1200 ft. of 2-in. acid-resisting, lead-lined, standard weight flanged steel pipe (Circular 86).

**Little Rock, Ark.**, closes bids June 15 for about 32 miles of 40-in. steel pipe, with alternate bids on cast iron and concrete, for main water supply from new source, where dam and pumping station will be located. Entire project will cost about \$3,500,000. Financing has been arranged. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

**Billings Gas Co.**, Billings, Mont., plans new steel pipe line for main gas trunk line supply near Laurel, Mont., with new lateral lines for replacements in system at Billings. Cost about \$50,000.

## CINCINNATI

... Sheet orders coming in at capacity rate.

... Pig iron buying off.

**CINCINNATI**, June 2.—While the full rush to cover before effective dates of price increases will not be felt until the middle of this month, sheet demand during the past week, swelled to 100 per cent of capacity output. In addition, completion of engineering details on new automobiles released a fair amount of tonnage for new model construction. Bookings from household equipment, stove and

electrical refrigeration manufacturers continue at good rate. Rolling schedules have been stepped up to accommodate bookings. Shipments continue steady.

Pig iron orders dipped slightly last week to about 1000 tons, all of which was for immediate needs. Shipments are about at the April rate and heavy ordering is absent. A slight tapering in foundry operations to about 50 per cent is reported, largely as the result of seasonal influences. Some automotive foundries are going forward

on castings for new models and the trade indicates that seasonal shutdowns may be avoided.

Under the influence of a lower melt, shipments of foundry grades of coke tend downward. Prices on industrial fuel, however, are steady, but an advance on domestic grades to \$5.40, freight allowed, was effective June 1.

Jobbers steel demand is moving slowly forward. May business exceeded April and inquiries this month indicate further improvement.

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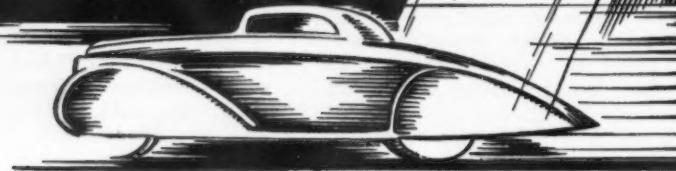
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# CLEVELAND



**... Ingot output rises five points to 77 per cent of capacity.**

• • •

**... Prices on cold-rolled strip and wire products not to be advanced.**

• • •

**... Ore movement in May topped 5,000,000 tons.**

**C**LEVELAND, June 2.—Ingot output in the Cleveland-Lorain district has advanced five points this week to 77 per cent of capacity. Republic Steel Corp. put on three open-hearth furnaces in Cleveland. Local sheet and strip mills continue to operate at near capacity.

No further price changes for the third quarter were announced during the week. Interest has centered largely on cold-rolled strip which was expected to be marked up \$2 a ton. However, a leading producer has announced that it will reestablish the present price for the coming quarter and other makers are expected to fall in line. Although no definite announcement has been made, no change is expected on wire products and an advance on reinforcing bars seems doubtful. Bolts and nuts are expected to be advanced for the coming quarter and rivet prices probably will be marked up. Many of the mills have fallen in line with announcements of price advances conforming with the upward revisions reported a week ago.

Finished steel continues in good demand from all sources except the motor car industry from which orders are tapering off as automobile manufacturers are drawing to the end of their production schedules on new models. The price advances are expected to assure the mills a heavy volume of specifications through June. Sales of sheets already have been stimulated by orders from consumers for material to carry them through July or longer and a spurt is expected to start this week in the demand for other products. Many consumers probably will lay in fair stocks at present prices. Automobile manufac-

turers are not expected to stock up on sheets to any great extent at the present prices because it is stated that they will not know the sizes they will require for their new models before July. Consumers apparently are offering little if any opposition to the higher steel prices.

### Pig Iron

With the reestablishment of prices for the third quarter a few small lot sales have been made for delivery through June and into the coming quarter. May ended with some increase in shipments over April. Price concessions of up to \$1 a ton are being made by an Ohio merchant furnace that is not in operation, in order to dispose of some of the iron on its stock pile. This producer set out to sell 10,000 tons of foundry iron, about one-half of which has been disposed of. This price shading is not affecting quotations by other producers. Shipments to automobile foundries are falling off, but the melt in other directions is being well maintained. Some of the production foundries are very busy.

### Bolts, Nuts and Rivets

An advance of 5 per cent on bolts and nuts for the third quarter is expected to be announced shortly. Increase in costs due to the advance in steel bar prices is the reason for the proposed advance. Higher steel prices may also bring an advance in rivet prices, which is now under consideration. While specifications from the motor car industry for bolts and nuts have dropped off, orders from other sources continue good.

### Sheets

An increased volume of business from miscellaneous consumers has followed the announcement of a \$2 advance in prices for the third quarter. Considerable new tonnage has been entered by refrigerator, washing machine and stove manufacturers. Demand for enameled sheets is heavy. Automobile manufacturers continue to place small lots to round out stocks for the manufacture of present models. These are not expected to stock up to any great extent this month for production of new models, as they probably will not definitely know the new sizes they will require for their 1937 cars. The present 2.75c., Pittsburgh, price on tin mill black has been reaffirmed for the third quarter. Present prices on electrical sheets also have been reaffirmed.

### Strip Steel

Prices on cold-rolled strip will not be marked up for the third quarter. While one producer announced a \$2 advance a week ago, the announcement was almost immediately withdrawn. With the \$2 a ton advance on hot-rolled strip, non-integrated mills were anxious for a similar advance on their product. On the other hand, some makers evidently would like to keep cold-rolled strip at its present price in order to reduce the severe sheet mill competition that has resulted from the slitting of sheets into strip widths. This competition has been quite severe during the past year.

### Bars, Plates and Shapes

Merchant bars continue to move in very good volume. Demand from the motor car industry has declined but this has been offset by a gain in miscellaneous business. No announcement of an advance on reinforcing bars has been made and a change seems doubtful. Three structural awards aggregating 750 tons were made in this territory during the week. Inquiries include 300 tons for a factory building in Warren, Ohio, and 225 tons for a highway bridge.

### Iron Ore

Shipments of Lake Superior ore made a good start during May. The movement by water during the month was 5,049,744 tons, and for the season until June 1, 5,069,190 tons, compared with 3,903,857 tons during the corresponding period last year or a gain of 30 per cent.



## ...Awards of 4100 tons —1625 tons in new projects.

### AWARDS

Allentown, Pa., 2600 tons, two reservoirs, to Concrete Steel Co., New York.

Butler, Pa., 175 tons, State highway project, to Electric Welding Co.

Los Angeles, 250 tons, two buildings at Virgil junior high school, to Concrete Engineering Co.

Los Angeles, 100 tons, maternity ward at St. Ann's hospital, to Soule Steel Co.

Los Angeles, 150 tons, administration building for twentieth Century-Fox Film Corp., to Concrete Engineering Co.

Los Angeles, 100 tons, two sound stages for Twentieth Century-Fox Film Corp., to Blue Diamond Corp.

Los Angeles, 100 tons, assembly hall at Hamilton high school, to Consolidated Steel Corp.

Winslow, Ariz., 175 tons, State subway, to Allison Steel & Machinery Co.

State of Wyoming, 130 tons, bridges in three counties, to unnamed bidders.

Missoula, Mont., 180 tons, post office, to Bethlehem Steel Co.

King County, Wash., 132 tons, State undercrossing at Black River Junction, to an unnamed bidder.

### NEW REINFORCING BAR PROJECTS

Port Arthur, Tex., 1075 tons, superstructure of Neches River bridge, contract No. 2; bids June 10.

Yellowstone National Park, Wyo., 150 tons, bridge for Bureau of Public Roads; bids June 9.

Los Angeles, 100 tons, building at Stevenson junior high school; bids opened.

Los Angeles, 100 tons, shop building at Adams junior high school; bids opened.

Avenal, Cal., 100 tons, school; bids opened.

Baldwin Park, Cal., 100 tons, school; bids opened.

## Tool Steel Prices Are Advanced

THE Firth-Sterling Steel Co., McKeesport, Pa., has announced advances in tool steels ranging from  $\frac{1}{4}$ c. to  $1\frac{1}{4}$ c. a lb. The new quotations were effective June 1 for delivery in the third quarter.

The following increases have been made on Firth-Sterling steels: Special ASV, from 22c. to 23c. a lb.; Best, from 18c. to 19c. a lb.; Extra, from 15c. to  $15\frac{3}{4}$ c. a lb.; Sterling, from 12c. to  $12\frac{1}{2}$ c. a lb.; Silver Star, from 9c. to  $9\frac{1}{4}$ c. a lb.; Auto Die, from 9c. to  $9\frac{1}{4}$ c. a lb.; Invaro, from 20c. to 21c. a lb., and J. S. punch steel, from 22c. to

$23\frac{1}{4}$ c. a lb. Other grades have been advanced proportionately.

The Vanadium Alloys Steel Co., Latrobe, Pa., announces the following prices, effective June 1, for third quarter business: Red Cut Superior,  $57\frac{1}{2}$ c. base; Red Cut Cobalt, 95c. base; E. V. M.,  $67\frac{1}{2}$ c. base; Marvel, 44c. base; Colonial No. 3, 44c. base; Ohio Air Die, 37c. base, and Crocar, 37c. base.

## Climax Molybdenum to Build New Laboratory

THE Climax Molybdenum Co. of Michigan has broken ground for a new laboratory on Woodrow Wilson Avenue just north of the Belt Line tracks in Detroit. The new building, which is of one-story construction and occupies a floor space of 220 x 60 ft., will cost approximately \$80,000. Additional laboratory and testing equipment to the extent of \$20,000 is also being added.

This new laboratory is to serve purely for development work in connection with the promotion of sales of molybdenum and molybdenum compounds to foundries, steel companies, power plants and dyeing establishments. It is in no sense a commercial laboratory and no development work will be undertaken except in connection with the use of molybdenum. This service is furnished to customers and prospective customers at no charge. Any work done at the request of a customer or prospect is treated strictly confidentially and no information developed is passed out without the customer's permission.

The new laboratory will have two chemical laboratories, one for organic work such as enters into the preparation of dyes and in the paint and ink industries. The inorganic laboratory will be largely for metallurgical work and in connection with it there is complete metallographic equipment and a physical testing laboratory. In the latter are tensile machines, Izod-Sharpy impact testers, a Moore fatigue machine, an alternating impact fatigue machine and the usual hardness testing equipment, such as Brinell, Rockwell, Shore and Monotron testers. There is a Dilatometer for determining the critical points of steel. The tensile machine is equipped for making tests at elevated temperatures. For tool steel work two lathes are provided for cutting tests and a drill press equipped with instruments for measuring torque and end pressure. This last machine has been built especially for the Climax Molybdenum Co. There are other machine tools, such as lathes, drill

presses and milling machines, for the manufacture of tensile test pieces.

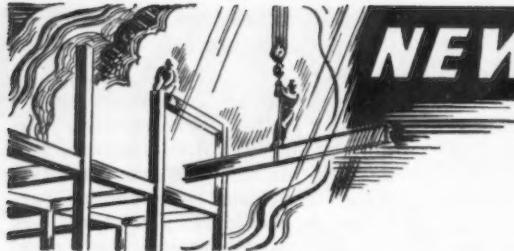
Heat-treating equipment to be included in the new laboratory consists of one gas-fired furnace, two Hoskins electric furnaces and two Hayes controlled atmosphere furnaces. In the foundry section there is equipment for melting both steel and cast iron, including one 30-lb. capacity high-frequency electric furnace, a Pittsburgh electric furnace with rated capacity of 500 lb. per hr. and a 50-lb. Detroit Electric rocking furnace. With this equipment it is possible to cast high-speed steel ingots up to 500 lb. for experimental work for tool steel companies. A Chambersburg hammer operating on compressed air will make it possible to forge such billets up to  $3\frac{1}{2}$  in. square section. Complete molding equipment is also provided for use with either steel or gray iron castings.

## New Data for Copper-Beryllium Alloys

A RECENT study at the National Bureau of Standards, Department of Commerce, of the linear thermal expansion of copper-beryllium alloys, now used in the electrical and aviation industries, shows that while the coefficients of expansion of various alloys containing up to 3.03 per cent of beryllium, do not differ by more than 8 per cent from the coefficient for copper, the differences in hardness, tensile strength, elongation and reduction of area are much greater. For example, it was stated, the tensile strength of copper-beryllium alloys may be more than four times as great as the tensile strength of copper.

The changes in length, density and volume for both the quenched and the hard drawn alloys are somewhat larger than the small changes noted for the aged alloys. The changes in length, volume and density of quenched copper-beryllium alloys depend upon the temperature and the time of aging. The density of copper-beryllium alloys decreases with increase of beryllium.

The results, when plotted, bring out the fact that the expansion curves of quenched copper-beryllium alloys containing 1.33 and 2.14 per cent beryllium, pass through critical regions which may be associated with structural changes accompanying aging. The stabilization of these alloys may be accomplished either by tempering or by cold working.



## NEW YORK

... Price advances have not yet affected finished steel demand.

• • •

... Large construction projects promised in Metropolitan area.

• • •

... New purchases by railroads are light.

NEW YORK, June 2.—Announcement of higher third quarter prices on many finished steel products has not yet had a noticeable effect on demand in this area. Business is still holding up well, but most of the buying is for immediate consumption and consumers are not yet showing much interest in their future requirements.

Third quarter prices have not yet been announced on a number of products and the belief is growing that quotations on these items will be reaffirmed. Wire products will likely be continued at current levels and the fact that skelp was not moved up indicates that pipe discounts will remain unchanged. No action has been taken on cold-rolled strip and the 2.60c., Pittsburgh, price may be reaffirmed. Steel sheet piling has been advanced \$2 a ton. Rails and track accessories are not expected to be changed until the fourth quarter. Bolt prices will be advanced by a 5 per cent reduction in supplementary discounts.

Market interest is again centered in the construction industry, as railroad buying is currently light. A school construction program in New York will require approximately 25,000 tons of structural steel and two sections of the West Side elevated highway being built by the New York Central Railroad will require about 12,000 tons. Bids are expected to be asked for this week. The New York Central is also said to be considering the purchase of additional rails.

Demand for tin plate remains the brightest spot in the market, although mills are in a rather uncomfortable position with respect to deliveries. The same thing is

still true regarding some finishes of sheets and strip steel.

### Pig Iron

Interest in pig iron was partly deflected during the week by the meeting of the American Iron and Steel Institute. Sales continued quiet, but with a new quarter opening up sentiment is improved. Bookings of spot iron in carload lots, which have comprised most of the turnover in the market for quite a period, should soon begin to yield some ground to more plentiful forward buying. No general announcement concerning third quarter prices is as yet forthcoming, but they are certain to be reaffirmed. One large seller in the district has taken some third quarter business at prevailing quotations, explaining that, for the time being, present prices are being applied to such contracts for third quarter delivery as customers wish to make. It is likely that when demand materializes in other directions for new quarter amounts the same procedure will be followed. Barge shipments of iron on the canal are brisk, and are moving partly into eastern Pennsylvania and partly contrawise by way of Long Island Sound. Latest reports indicate that Mystic stack at Everett, Mass., will be blown in June 15.

### Reinforcing Steel

The largest award of reinforcing bars for several weeks in this district was the 2600 tons given to Concrete Steel Co., New York, for two reservoirs at Allentown, Pa. It has been reported that bids on 130 tons for a stadium at Jersey

City, which were taken May 28, are to be readvertised. Otherwise the market is featureless, with small lots for miscellaneous purposes occupying the sellers. Prices are only fair, with rumors again prevalent of heavy cutting in various sectors of the Metropolitan area. It is expected, however, that the near future will bring to the fore several jobs of very respectable proportions.



... Long expected increase in British prices finally announced.

• • •

... Large inquiries being received for semi-finished steel.

LONDON, June 2 (By cable)—British domestic prices have been advanced 12s, 6d for sections, joists and plates; 6s for small bars, hoop and strip; 5s for billets; 2s, 6d for basic pig iron; and 3s, 6d for hematite. All prices are immediately effective despite an earlier decision to make no change before July.

Pig iron supplies are likely to remain tight for some months. Foundry iron makers are unable to accept prompt orders and an unofficial premium of .5s is being charged for advance orders. Hematite makers are heavily sold up to the end of the year and are behind in deliveries. New business is quiet.

Steel works are curtailing the Whitsun holidays owing to the pressure for deliveries. Removal of price uncertainty is expected as a result of placing large advance orders. Already large inquiries have been reported for semi-finished and manufactured steel. Makers of semi-finished are booked for some months ahead and large additional imports from the Continent are necessary.

Home business in tin plate is moderate and export is quiet. International Tin Plate Cartel negotiations are reported to have resulted in the virtual conclusion of a new agreement contingent upon the continuance of the Cartel until June, 1938.

Continental iron and steel is still dull but consumers' stocks are believed to be almost exhausted so business may soon expand.

## BOSTON

... Massachusetts may exempt machinery from city taxes.

... Pig iron sales still light.

**BOSTON**, June 2.—New England industrial activity continues to make a good showing despite the holiday. Legislation is in progress in the Massachusetts House of Representatives to exempt machinery used in manufacturing from taxation in cities and towns. The bill has been ordered to a third reading. Possibly nothing has transpired in this state to encourage manufacturing in general for many years as this legislation has. If the bill becomes law it is estimated \$5,000,000 to \$10,000,000 will immediately be invested in manufacturing machinery.

Sales of pig iron the past week were mostly in small lots but fairly frequent with the aggregate around 1500 tons. Although the aggregate weekly melt has not increased noticeably there are certain indications it will be stepped up late this month or early in July as a result of casting orders from special machinery, refrigerator, stove, washing machine, farm accessories and electrical goods manufacturers. Offerings of imported iron are somewhat freer, and prices for at least two brands are \$1 a ton or more less than for domestic, but consumers are taking comparatively little.

## BUFFALO

... Open-hearth operations again increased.

... Pig iron shipments heavy.

**BUFFALO**, June 2.—Open-hearth operations in local mills have again been stepped up, with Bethlehem's Lackawanna plant now operating 22 units; Republic Steel Corp., seven and Wickwire Spencer, two. Seneca sheet division is at 85 per cent of capacity.

A Buffalo concern will fabricate 300 tons of structural for a mill,

warehouse and elevator building for the Grange League Federation's Buffalo plant.

An outside fabricator has the contract for furnishing the 680 tons of steel for an addition to the Corning Glass Works. Bids will be taken June 8 for a 400-ton addition to the plant of the Union Carbon & Carbide Co. at Niagara Falls.

Pig iron sales are holding up and shipments continue steady and in good volume.

## CAST IRON PIPE

Cotuit, Mass., has awarded 800 tons of 6 to 12-in., to Warren Foundry & Pipe Corp.

Marlboro, Mass., closed bids June 1 on 14,000 ft. of 6 and 8-in. Award will be made this week.

Charlestown, N. H., has under advisement bids on 13,000 ft. of 6-in. and will make award this week.

Indianapolis Water Co., Indianapolis, plans 16-in. in part of Forty-sixth and Twentieth Streets for main water system; also for elevated steel tank in first noted district to increase water pressure.

Hancock, Mich., plans pipe lines for water system, including service at Houghton, Mich., with distributing lines. Cost about \$220,000 with other waterworks installation. Financing will be arranged through Federal aid. Carl W. Hanke, mayor of Hancock, is active in project.

Ashley, Ohio, will take bids soon for pipe for water system; also for pumping station, elevated steel tank and tower, and other waterworks installation. Jennings & Lawrence, 12 North Third Street, Columbus, Ohio, are consulting engineers.

Lexington, Va., closes bids June 9 for pipe for water system; also for pumping

equipment and other waterworks installation. Wiley & Wilson, Lynchburg, Va., are consulting engineers.

Demorest, Ga., closes bids June 9 for about two and one-half miles of 6 to 2-in. for water system, with fittings; also for about 4000 ft. of 3/4-in. copper pipe for service connections, with standard fittings. Robert & Co., Inc., Bona Allen Building, Atlanta, Ga., is consulting engineer.

Atlanta, Tex., plans pipe lines for water system; also pumping plant and other waterworks installation. Fund of \$100,000 is being arranged for this and sewer system. E. J. Von Zuben, Fort Worth, Tex., is consulting engineer.

Milwaukee closes bids June 4 on 1005 tons of water pipe, various sizes, and 68 tons of special castings. (C. P. No. 17.)

Oklahoma City, Okla., plans trunk mains and distributing pipe lines for water system in all city districts. Project will include steel water towers, extensions in filtration plant and other waterworks installation. Cost about \$1,500,000. Financing is under consideration. Fund of \$100,000 has been authorized for pipe line for main water supply in Capitol Hill district. Thomas G. Banks is water engineer.

Riverside, Cal., has authorized new 10-in. pipe line in Victoria Avenue for water system. R. L. Boulden is water superintendent in charge.

Sheridan, Wyo., has awarded 4296 tons of 16-in. for city water system improvements to United States Pipe & Foundry Co.

Eureka, Cal., awarded 120 tons of 12-in. to American Cast Iron Pipe Co.

Jefferson, Ore., has purchased 123 tons of 4 and 6-in. from an unnamed bidder.

Portland, Ore., has opened bids on 495 tons of 6, 8 and 12-in. on which United States Pipe & Foundry Co. is low bidder.

Elma, Wash., will take bids soon for 8-in. pipe for extensions in water system. Cost about \$20,000. About 16,000 ft. of 8-in. is also planned for extensions in water system in Satsop district. Water committee, S. F. Berdine, chairman, is in charge. E. G. Hunt, 221 West Second Street, Aberdeen, Wash., is consulting engineer for last mentioned project.

Los Angeles Department of Water and Power will open bids within 90 days on five contracts involving 1127 tons of 16 and 24-in.

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# PHILADELPHIA



... *Operating rate unchanged at 44 per cent.*

• • •

... *Consumers show little inclination to stock steel.*

• • •

... *Construction requirements continue to lag.*

PHILADELPHIA, June 2.—A number of consumers are showing some resentment against higher third quarter prices. The railroads, particularly, view the action with distaste, inasmuch as it comes at a time when the I.C.C. has forced rail rates down. So far, there has been little tendency on the part of consumers to stock tonnages as protection against the higher price levels. Nevertheless, most sellers believe that bookings will be accelerated toward the end of the month as buyers attempt to get orders on the books in the hope that delivery will be extended into third quarter.

During this season of the year, building activity is usually at a maximum. However, awards of shapes and reinforcing bars have latterly shown a tendency to ease off. Several large projects are scheduled for early awards, but fabricating shops are not receiving plans for many new buildings of any size.

Mills in this area are beginning to receive some protective tonnages in addition to normal June requirements. Consequently, open-hearth activity is being maintained at the same level as last week. The current rate of 44 per cent compares favorably with a rate of 32 per cent for the same period a year ago.

## **Pig Iron**

Current quotations have been extended for third quarter delivery, but very little business has been booked for this period. Stable prices discourage any stocking on the part of melters; consequently sellers look for no change in the present foundry practice of ordering iron in carlots for quick shipment. There has been an exceptional volume of foreign iron moving into this area within the past several months.

## **Plates and Shapes**

Baldwin Locomotive Works is tentatively placing the steel requirements for 10 locomotives for the New York, New Haven and Hartford Railroad. This same company is now bidding on 18 locomotives for the Southern Pacific. Releases from shipbuilders have been very light and railroads show no interest in new commitments. The new price of 2.09c., delivered Philadelphia, for plates is not expected to accelerate the placing of third quarter tonnages. Demand for shapes continues to lag. Bethlehem Steel Co. received orders aggregating 1650 tons during the week, but otherwise the market has been confined to small lots. A sizable tonnage is currently active and scheduled for early awards, but there are not many new projects of any size in the hands of estimators. For third quarter, shapes will be priced at 2.11½c. a lb., delivered Philadelphia.

## **Bars**

Cold-finished bars and merchant bars are up \$3 and \$2 a ton respectively for third quarter delivery. However, as yet there has been very little tendency on the part of consumers to lay in stocks. In view of the slightly weak undertone for reinforcing bars, producers have decided not to advance quotations. Shipments of reinforcing bars against old contracts are comparatively satisfactory, but new orders are scarce. Over 2600 tons of bars has been let to Concrete Steel Co. for two reservoirs at Allentown, Pa.

## **Sheets and Strip**

Sellers have booked a fair amount of June tonnage as many consumers are attempting to protect themselves in a moderate way against third quarter price advances. Most mills are still able to satisfy all de-

mands for June delivery of blue-annealed and hot-rolled sheets, but several of the larger companies are no longer willing to take certain cold-rolled grades at second quarter price levels. Many sellers still believe that all shipments of low priced material will not be completed by the end of June.

## **Imports**

The following iron and steel imports were received here last week: 400 tons of pig iron from British India; 197 tons of ferromanganese from the Netherlands; 48 tons of steel tubes, 10 tons of steel bars, 7 tons of steel billets, and 2 tons of steel forgings from Sweden, and 48 tons of structural shapes.



## **BIRMINGHAM**

... *Pig iron prices are reaffirmed.*

... *Rail mill to shut down June 15.*

BIRMINGHAM, June 2.—Books have been opened for the third quarter, but buying activity will probably be light during the next few weeks. There is no change in pig iron quotations, and the current base of \$15.50 continues.

With the announcement of an advance of \$2 a ton on bars, plates, shapes, strips and sheets, effective July 1, greater buying is anticipated for this month in these products.

Blast furnace and open-hearth operations will likely be affected by the closing of the Ensley rail mill on June 15. Four blast furnaces and three open-hearths have been operating at Ensley. No announcement has been made as yet relative to the schedules after the rail mill is stopped, but reductions are expected.

The Bessemer, Ala., plant of the Pullman-Standard Car Mfg. Co. is scheduled to start work June 15 on 100 phosphate cars for the Seaboard Air Line.

Virginia Bridge Co. has booked 420 tons of structural steel for the City Hall at Montgomery, Ala.; Nashville Bridge Co., Bessemer, Ala., will fabricate 75 tons of structural steel for a grade crossing project in Acadia Parish, La.

Weekly shipments are now being made on the steel pipe for the Birmingham industrial water system.

Blast furnace and open-hearth operations remain the same.

## Metallic Manganese Is Produced From Low-Grade Ores

WASHINGTON, June 2.—An announcement by the Bureau of Mines of the development of a method for the electrolytic production of metallic manganese from its low-grade ores is of special importance to the steel industry.

The Bureau states that it has long been recognized that many of the more extensive manganese ore deposits in this country would lend themselves readily to leaching processes. The recovery of manganese in metallic form from these leach liquors has been the step which has prevented the commercial application of these hydro-metallurgical methods. It is therefore important to learn that manganese has at last been brought in line with copper, zinc, lead and aluminum in being susceptible to electrolytic recovery.

R. S. Dean, chief metallurgist of the Bureau, has informed THE IRON AGE that the newly developed method is simple and cheap and entirely adaptable to commercial utilization. The process in its simplest form, according to Mr. Dean, uses nothing but sulphur dioxide for leaching and electrolytic current for deposition. With less favorable ores, limestone is required. The metal is deposited as a bright coherent mass and is very pure. It remains bright indefinitely in the air.

The success of the process is said to depend upon an ingenious method of maintaining absolutely constant acidity of the solution during deposition.

Approximately 4000 kw-hr. will be required to deposit a ton of manganese. With large manganese deposits conveniently located to Boulder Dam and other Federal power projects, the power cost for producing manganese may be as low as \$10 per ton.

Whether or not the metal produced by the new method can be delivered at eastern furnaces at a cost to compete with ferromanganese produced from imported ores remains to be determined, according to Mr. Dean. The Bureau of Mines proposes to do this if the proposed electro-metallurgical pilot plant at Boulder City is built. Funds for such a plant are provided in the Interior appropriation now before Congress.

In any case, the Bureau's work seems to have provided the basis

for the addition of metallic manganese to the increasing list of high purity metals which are cheaply available to the producer of alloys.



... Los Angeles water system will buy 15,000 tons of pipe.

... Scrap exports higher this year.

SAN FRANCISCO, June 1.—Completed plans of the Los Angeles Department of Water and Power call for the expenditure of \$4,323,100 for improvements and extensions to the distribution system. Of the total 189,501 ft. of 24 to 52-in. welded pipe, weighing approximately 15,168 tons, bids have been opened on the Stone Canyon unit which involves 7780 tons. Southwest Welding & Mfg. Co. is low bidder. The remaining contracts which will all be placed

within 90 days, include 1127 tons of cast iron pipe, 7388 tons of welded steel pipe and an unannounced tonnage of reinforcing bars.

Outstanding among new projects reported during the past week was the call for bids at Austin, Tex., for the construction of the superstructure of the Neches River bridge which is being placed near Port Arthur. Specifications call for 9750 tons of structural steel and plates and 1075 tons of reinforcing bars. Bids are to be opened June 10.

United States Pipe & Foundry Co. booked 4296 tons of 16-in. cast iron pipe for distribution lines at Sheridan, Wyo., the heaviest award of the week. At Los Angeles, the Western Pipe & Steel Co. is low bidder on 1442 tons of 24 and 36-in. welded pipe for the Department of Water & Power. Reinforcing lettings in southern California aggregated 1083 tons, 500 tons of which went to Concrete Engineering Co. Bookings in northern California and the Northwest were unimportant.

Contrary to previous reports, foreign export of scrap from the southern California territory is understood to have increased during the first five months of this year over the total tonnage of the corresponding period of last year. Scrap prices are firm, inventories have been held about constant and domestic demand is brisk.

Steel mill production is holding at near capacity.

## NOPAK VALVES

An air leak equal to  $\frac{1}{16}$ " diameter hole costs \$28.00 per month. Air is expensive, control it efficiently and accurately with a NOPAK valve—a patented leak-proof valve guaranteed to stay tight without maintenance. Its flat, patented disc together with a packless spindle prevents sticking and assures you of many years of leak-proof operation. Permits throttling or quick opening. Easy to operate. Seat protected at all times and cannot wear out. NOPAK valves are suitable for air, gas, water, or oil. Write for Bulletins.



Made in shut-off, three-way and four-way styles  $\frac{1}{4}$ " to 2" pipe openings, three and four-way for operating single and double acting cylinders.

**GALLAND-HENNING**  
MANUFACTURING COMPANY  
2724 S. 31st Street Milwaukee, Wisconsin

ALSO COMPLETE LINE OF BALERS: Electric and Hydraulic, also HYDRAULIC PRESSES and PUMPS

# May Pig Iron Output Up Almost Six Per Cent

PRODUCTION of coke pig iron during May amounted to 2,648,401 gross tons, compared with 2,403,683 in the preceding month. The daily rate last month showed a rise of 6.6 per cent over that of April, or from 80,123 to 85,432.

There was a gain of three furnaces making iron on June 1, the 147 furnaces operating at a rate of 86,385 daily, against 144 furnaces one month before which were producing iron at a rate of 84,915 tons daily. The steel corporation blew in one furnace, independent steel companies blew in four and took one off blast and one merchant furnace was blown out or banked.

Among the furnaces blown in were the following: One Farrell, Carnegie-Illinois Steel Corp.; one Susquehanna, National Steel Corp.; one Eliza, Jones & Laughlin Steel Corp.; one Brier Hill, Youngstown Sheet & Tube Co., and one Betty, Republic Steel Corp.

Furnaces blown out or banked were a Toledo furnace of Pickands, Mather & Co., and a unit of the Colorado Fuel & Iron Co.

## Production by Districts and Coke Furnaces in Blast

Furnaces	Production (Gross Tons)		June 1		May 1	
	May (31 Days)	April (30 Days)	Number in Blast	Operating Rate, Tons a Day	Number in Blast	Operating Rate, Tons a Day
<b>New York:</b>						
Buffalo	177,576	152,143	10	5,730	9	5,365
Other New York and Mass.	21,091	5,303	2	680	2	575
<b>Pennsylvania:</b>						
Lehigh Valley	43,338	37,927	4	1,400	4	1,775
Schuylkill Valley	24,799	24,192	2	800	2	805
Susquehanna and Lebanon Valleys	14,080	12,455	1	455	1	415
Ferromanganese	...	...	0	...	0	...
Pittsburgh District	578,690	506,553	29	19,065	28	18,355
Ferro. and Spiegel	17,377	10,261	3	560	3	340
Shenango Valley	36,438	23,038	3	1,670	2	1,050
Western Pennsylvania	79,188	84,158	5	2,555	5	2,965
Ferro. and Spiegel	6,067	5,910	1	195	1	195
Maryland	102,847	109,395	4	3,485	4	3,645
Wheeling District	146,504	119,293	7	4,725	7	4,240
<b>Ohio:</b>						
Mahoning Valley	271,079	239,373	13	8,970	12	8,405
Central and Northern	243,123	234,375	13	7,670	13	7,815
Southern	40,146	44,247	4	1,295	4	1,475
Illinois and Indiana	537,668	488,611	24	17,345	24	17,135
Michigan and Minnesota	80,832	78,046	5	2,605	5	2,600
Colorado, Missouri and Utah	40,276	48,852	3	1,140	4	1,630
<b>The South:</b>						
Virginia	...	...	0	...	0	...
Ferro. and Spiegel	2,767	2,825	1	90	1	95
Kentucky	14,012	12,995	1	450	1	435
Alabama	170,503	162,944	12	5,500	11	5,430
Ferromanganese	...	787	0	...	1	170
Tennessee	...	...	0	...	0	...
Total	2,648,401	2,403,683	147	86,385	144	84,915

## Daily Average Production of Coke Pig Iron

	1936	1935	1934	1933	1932
January	65,351	47,656	39,201	18,348	31,380
February	62,886	57,448	45,131	19,798	33,251
March	65,816	57,098	52,243	17,484	31,201
April	80,125	55,449	57,561	20,787	28,430
May	85,432	55,713	65,900	28,621	25,276
June	...	51,750	64,338	42,166	20,935
1/2 year	...	54,138	54,134	24,536	28,412
July	...	49,041	39,510	57,821	18,461
August	...	56,816	34,012	59,142	17,115
September	...	59,216	29,935	50,742	19,753
October	...	63,820	30,679	43,754	20,800
November	...	68,864	31,898	36,174	21,042
December	...	67,950	33,149	38,131	17,615
Year	...	57,556	43,592	26,199	23,733

## Production of Coke Pig Iron and Ferromanganese

	Gross Tons Pig Iron*	Ferromanganese†
	1936	1935
January	2,025,885	24,766
February	1,823,706	10,048
March	2,040,311	24,988
April	2,403,683	12,288
May	2,648,401	17,762
June	1,552,514	17,541
1/2 year	9,799,000	12,961
July	1,520,263	88,902
August	1,761,286	13,175
September	1,776,476	12,735
October	1,978,411	15,983
November	2,065,913	19,007
December	2,106,453	18,245
Year	21,007,802	17,126
		185,173

\*These totals do not include charcoal pig iron. The 1934 production of this iron was 25,834 gross tons.

†Included in pig iron figures.

## Merchant Iron Made, Daily Rate

	Tons	1936	1935	1934	1933	1932
January	10,537	3,926	7,800	2,602	6,256	6,256
February	11,296	6,288	7,071	2,863	7,251	7,251
March	10,831	7,089	7,197	2,412	1,157	1,157
April	13,897	8,799	8,838	1,908	5,287	5,287
May	...	8,441	9,099	3,129	4,658	4,658
June	...	7,874	9,499	4,088	6,090	6,090
July	...	8,644	7,880	6,783	3,329	3,329
August	...	8,194	6,043	7,756	3,070	3,070
September	...	10,090	4,986	10,034	3,213	3,213
October	...	11,199	5,765	8,634	4,286	4,286
November	...	12,503	6,610	7,639	4,435	4,435
December	...	13,312	4,399	8,358	3,674	3,674

## Booklet Describes

### Boride Alloys

THE Colmonoy Co., Los Nietos, Cal., has just issued its booklet No. 50 which fully describes all the recent experiments of this company in the production of boride alloys. Information is also given regarding the overlaying of ferrous metals with a mixture of "X" crystals and chromium-boride crystals to form a surface having high wear, corrosion and heat resistance. The booklet describes alloys having a tungsten steel base alloyed with Colmonoy crystals, a nickel base alloyed with Colmonoy crystals, and alloys having steel and copper bases with Colmonoy additions. This same company also supplies welding rods suitable for building up boride alloy surfaces or for repairing castings, etc.



... Domestic copper sales in May were 16,303 tons.

• • •

... Lead and zinc are both in stronger demand.

• • •

... Quota uncertainties depress tin price to lowest point in over a year; statistics unfavorable.

NEW YORK, June 2.—Activity in domestic copper is confined to routine sales, as heretofore, with affiliated fabricating companies responsible for the buying. Total bookings in May were 16,303 tons, and while the volume was small, compared with April's excessive tonnage it must be viewed satisfactorily. Foreign demand for copper is currently quiet, and the export price for electrolytic is about 9.10c. a lb., c. i. f., European base ports. In the home market, no change is evident, with producers holding to 9.50c. a lb., Connecticut Valley. Domestic sales yesterday were 487 tons.

#### Zinc

Sales of Prime Western zinc aggregated 4649 tons last week, as against only 1971 tons the week before. Shipments rose to 5169 tons, and unfilled orders declined 520 tons to 27,612 tons at the period's close. Sales were the heaviest they have been in quite a time, but in other respects the market underwent little change. Additional slight declines in the foreign price of spelter have reduced that factor to near parity with the domestic quotation. This renders it impossible for producers here to advance prices at present, although it is felt they would be strongly minded to do so provided opportunity existed. Currently the market price for zinc has not varied, and is holding firm at 4.90c. a lb., East St. Louis, and 5.27½c., New York.

#### Lead

Demand for lead is stronger than when last reported. The past week

saw sales double in volume over the previous six days' trading, and this week has opened equally good.

Buying still has a pace to go before reaching an 8000-ton weekly volume, reputed to be normal, but the trend appears to be strengthening in line with the prevailing attitude that consumers have about exhausted inventories and will soon have to replace these supplies. June needs are now thought to be 75 per cent covered, and July is selling in fair volume. June bookings by one leading seller have already surpassed the company's entire May volume. Demand is reported well diversified, with practically all consuming lines in the market for stipulated amounts. Estimates place the volume of lead shipments in May at between 32,000 and 34,000 tons. It is not felt, however, that consumption is slackening as contrasted with April when over 40,000 tons was moved, the explanation being that heavy shipments originating toward the end of April in many cases did not arrive at centers of consumption

#### The Week's Prices. Cents Per Pound for Early Delivery

	May 27	May 28	May 29	May 30	June 1	June 2
Electrolytic copper, Conn.*	9.50	9.50	9.50	9.50	9.50	9.50
Lake copper, N. Y. ....	9.62½	9.62½	9.62½	9.62½	9.62½	9.62½
Straits tin, Spot, New York	45.87½	45.25	44.75	...	44.50	44.00
Zinc, East St. Louis	4.90	4.90	4.90	4.90	4.90	4.90
Zinc, New York†	5.27½	5.27½	5.27½	5.27½	5.27½	5.27½
Lead, St. Louis	4.45	4.45	4.45	4.45	4.45	4.45
Lead, New York	4.60	4.60	4.60	4.60	4.60	4.60

\*Delivered Connecticut Valley; price ¼c. lower delivered in New York.

†Includes emergency freight charge.

Aluminum, virgin 99 per cent plus, 19.00c.-21.00c. a lb., delivered.

Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.

Antimony, Asiatic, 13.50c. a lb., New York.

Quicksilver, \$75.00 to \$76.00 per flask.

Brass ingots, commercial 85-5-5, 9.25c. a lb., delivered; in Middle West ¼c. a lb.

is added on orders for less than 40,000 lb.

#### From New York Warehouse

##### Delivered Prices, Base per Lb.

Tin, Straits pig	45.75c. to 46.75c.
Tin, bar	47.75c. to 48.75c.
Copper, Lake	10.25c. to 11.25c.
Copper, electrolytic	10.25c. to 11.25c.
Copper, castings	10.00c. to 11.00c.
*Copper sheets, hot-rolled	17.00c.
*High brass sheets	15.12½c.
*Seamless brass tubes	17.37½c.
*Seamless copper tubes	17.50c.
*Brass rods	13.12½c.
Zinc, slabs	5.75c. to 6.75c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	10.25c.
Lead, American pig	5.10c. to 6.10c.
Lead, bar	6.10c. to 7.10c.
Lead, Sheets, cut...	8.25c.
Antimony, Asiatic	14.00c. to 15.00c.
Alum, virgin, 99 per cent plus	23.30c.
Alum, No. 1 for remelting, 98 to 99 per cent	18.50c. to 20.00c.
Solder, ½ and ¼	29.50c. to 30.50c.
Babbitt metal, commercial grades	25.00c. to 60.00c.

\*These prices are also for delivery from Chicago and Cleveland warehouses.

#### From Cleveland Warehouse

##### Delivered Prices Per Lb.

Tin, Straits pig	49.25c.
Tin, bar	51.25c.

Copper, Lake ..... 10.25c. to 10.50c.

Copper, electrolytic 10.25c. to 10.50c.

Copper, castings ..... 10.00c. to 10.25c.

Zinc, slabs ..... 6.50c. to 6.75c.

Lead, American pig. 5.20c. to 6.50c.

Lead, bar ..... 8.50c.

Antimony, Asiatic ..... 15.00c.

Babbitt metal, medium grade. 19.00c.

Babbitt metal, high grade. 53.25c.

Solder, ½ and ¼ ..... 26.75c.

Copper, hvy. crucible ..... 10.25c. to 10.50c.

Copper, hvy. and wire ..... 10.00c. to 10.25c.

Copper, light and bottoms ..... 6.50c. to 6.75c.

Brass, heavy ..... 6.25c. to 6.75c.

Brass, light ..... 4.12½c. to 4.75c.

Hvy. machine composition ..... 3.37½c. to 4.12½c.

No. 1 yel. brass turnings ..... 6.12½c. to 6.62½c.

No. 1 red brass or compos. turnings ..... 5.12½c. to 5.62½c.

Dealers' Buying Prices

Dealers' Selling Prices

Copper, hvy. crucible ..... 7.37½c. to 8.12½c.

Copper, hvy. and wire ..... 7.25c. to 7.75c.

Copper, light and bottoms ..... 6.25c. to 6.75c.

Brass, heavy ..... 4.12½c. to 4.75c.

Brass, light ..... 3.37½c. to 4.12½c.

Hvy. machine composition ..... 6.12½c. to 6.62½c.

No. 1 yel. brass turnings ..... 5.12½c. to 5.62½c.

No. 1 red brass or compos. turnings ..... 5.75c. to 6.25c.

Lead, heavy ..... 3.62½c. to 4.00c.

Sheet aluminum ..... 13.25c. to 14.75c.

Zinc ..... 2.50c. to 2.87½c.

Cast aluminum ..... 12.12½c. to 13.25c.

until May had opened, and thus obviated the necessity of greater deliveries during the latter period. June movement of the metal should show a compensatory influence. Meanwhile producer quotations are steady and firm at 4.60c. a lb., delivered New York, except for St. Joseph Lead Co., whose price is 4.65c.

### Tin

The spot price for tin has been declining steadily since last Tuesday, and there has been some buying on the decline. On the whole, however, the amount of this buying has been disappointing, particularly with respect to tin plate producers, who, be it remembered, are currently occupied at 100 per cent of capacity. Weakness in the price initiated in London, where uncertainty over quota arrangements and disposition of Bolivia's unproduced allotment reacted in considerable nervousness. An additional encumbrance developed yesterday when it was officially announced that the world's visible supply of tin increased 1812 tons during May. American deliveries in May totalled 5235 tons, and likewise were disappointing. The New York quotation for spot Straits tin today is 44.00c. a lb., the lowest point it has reached in well over a year. London prices, too, are down, with standard spot quotable this morning at £192 and futures at £189. The Eastern price was £194 10s.

### Non-Ferrous Averages

The average prices for major non-ferrous metals for May based on daily quotations in THE IRON AGE, are as follows:

	Average
Electrolytic copper, Conn.†..	9.500c. a lb.
Lake copper, Eastern de-	
livery .....	9.625c. a lb.
Straits tin, spot, N. Y. ....	46.818c. a lb.
Zinc, East St. Louis.....	4.900c. a lb.
Zinc, New York.....	5.275c. a lb.
Lead, St. Louis.....	4.450c. a lb.
Lead, New York.....	4.600c. a lb.

†Price  $\frac{1}{4}$ c. lower in New York.

## RAILROAD BUYING

Norfolk & Western will air-condition 42 additional passenger cars in its shops at Roanoke, Va.

Baltimore & Ohio will air-condition 57 additional passenger cars.

## Electrodes for High Tensile Steels

A SERIES of electrodes for welding the new high carbon and low alloy high tensile steels with tensile strengths ranging from 65,000 to 100,000 lb. per sq. in. has been brought out by the Champion Rivet Co., Cleveland. These Red Devil electrodes, as they are designated, are in three groups distinguished by numerals 75, 85 and 95, which indicate in 1000-lb. per sq. in. the mean tensile strength of the welds produced with the electrodes under average conditions. The high physical properties of these electrodes are attributed to the introduction of various ferro-alloys including a small percentage of molybdenum which tend to add creep strength of the deposited metal.

The following types and grades of steel may be welded with these electrodes: A.S.T.M. A-149 and A-150; U.S.N. Specifications SGS-118; 1.5 per cent nickel sheet; 0.50 per cent chrome series of steels; 2½ per cent nickel carbon molybdenum steel and structural silicon steel.

## TRADE NOTES

Sintering Machinery Corp. has moved to 19 Rector Street, New York.

Westco Pump Corp., Davenport, Iowa, will merge with Micro Corp., Bettendorf, Iowa, forming Micro-Westco, Inc., Bettendorf Office Building, Bettendorf.

Philadelphia Drying Machinery Co., 3351 Stokely Street, Philadelphia, has appointed Beeman Combustion Supply Co., 2970 West Grand Boulevard, Detroit, as engineering-sales representatives of the industrial furnace division.

United Metals Corp., 69-81 Polk Street, Newark, N. J., dealer in scrap iron, metals, etc., has acquired plant, including buildings, land, equipment, raw materials, etc., of Stanton Forging Co., Inc., Camden, N. J., manufacturer of forge rings, tool steel, crankshafts, shafting, connecting rods, etc. Formation of a new company is under consideration to continue operation of plant.

## This Week on the Assembly Line

(CONTINUED FROM PAGE 59)

given above, but by at least ten to one. In order to maintain output even equivalent to the former in the same floor space, it has been necessary to go to multiple-spindle machines of the vertical type. Whereas eight spindle units have heretofore been considered standard, it is understood that Ford is considering the purchase of 12-spindle and even 24-spindle machines. In other words, the objective is to have as many tools cutting at one time as possible, and if the number of turning units must be increased, then they must be stood on end, in effect, so as not to absorb all available floor space.

Automobile manufacturers, with their constantly changing models and large rehabilitation programs, offer splendid opportunities to the machine tool builders for developing new techniques. With large volume production, expensive tool set-ups are justified and write-offs are frequently possible inside of a year with the savings made over former methods. A great deal of the equipment that has been purchased in the last few months has been for cylinder block lines. One of these lines for the first time will feature broaching operations on the top and bottom of the block. Saving in time over milling is tremendous. A wide, flat broach can be pulled across one of these blocks in a matter of 5 seconds, whereas the best milling time is about  $2\frac{1}{4}$  min. The chief problem here was to solve the method of supporting the block. The roughing operation by broach can be broken up, but in the finishing operation a single wide tool must be used. The pressure that such a broach develops on a large surface, such as a cylinder block top, is tremendous, and in reality the block must be designed to withstand this tremendous load without distortion. This is looked upon as perhaps the most interesting development of the year as far as machine shop methods are concerned, and the performance of the equipment will be looked forward to with a great deal of interest.



# FABRICATED STEEL

... Lettings in fair volume at 20,350 tons as against 11,900 tons last week.

• • •

... New projects decline to 11,825 tons from 27,400 tons in the previous week.

• • •

... Plate awards call for 1000 tons.

#### NORTH ATLANTIC STATES

Roxbury, Mass., 220 tons, N. E. Baptist hospital, to A. O. Wilson Structural Co.

Springfield, Mass., 175 tons, forge shop, Moore Drop Forging Co., to Haarman Steel Co.

East Hartford, Conn., 900 tons, United Aircraft factory, to Bethlehem Steel Co.

New York, 185 tons, Harlem Health Centers, 137th Street, to Weatherly Steel Co.

New York, 1800 tons, nurses' residence on Welfare Island, to Bethlehem Fabricators, Inc.

Rockland County, N. Y., 190 tons, highway bridge, to Bethlehem Steel Co.

Sidney, N. Y., 465 tons, highway bridge, to American Bridge Co.

Sonyea, N. Y., 190 tons, highway bridge, to Mount Vernon Bridge Co.

Steuben County, N. Y., 400 tons, bridge, to Lackawanna Steel Construction Co.

Tioga County, N. Y., 285 tons, bridge, to R. S. McManus Steel Construction Co.

Jersey City, 2975 tons, medical building, Hudson county, to Lehigh Structural Steel Co.

Oak Lane, Pa., 350 tons, highway bridge, to American Bridge Co.

Saltsburg, Pa., 250 tons, reconstruction of building, Keystone Coal Co., to American Bridge Co.

Newark, Del., 310 tons, bridge over Pennsylvania Railroad, to Bethlehem Steel Co.

Amecelle, Md., 1340 tons, three buildings for Celanese Corp., to Bethlehem Steel Co.

Washington, 1170 tons, Home Owners Loan Corp. building, to Bethlehem Steel Co.

Washington, 1300 tons, building for Bureau of Printing and Engraving, to Bethlehem Steel Co.

#### THE SOUTH

Richmond, Va., 500 tons, clinic building for Medical College of Virginia, to Bethlehem Fabricators, Inc.

Jefferson County, Ky., 815 tons, grade separation, to Virginia Bridge Co.

Wilson Dam, Ala., 170 tons, extension to fertilizer building, to Converse Bridge & Steel Co.

#### CENTRAL STATES

Highland, Ind., 290 tons, highway bridge, to Bethlehem Steel Co.

Detroit, 210 tons, factory building, Budd Wheel Co., to R. C. Mahon Co.

Youngstown, 200 tons, addition for Republic Steel Corp., to Fort Pitt Bridge Works Co.

Brighton, Ohio, 310 tons, Chesapeake & Ohio Railroad bridge, to American Bridge Co.

Cleveland, 320 tons, highway bridge, Triskett Road, to Fort Pitt Bridge Works Co.

Mahoning County, Ohio, 130 tons, highway bridge, to Burger Iron Co.

Chicago, 2050 tons, extension to mill building, International Harvester Co., 1600 tons to Wisconsin Bridge & Iron Co., 450 tons to Worden-Alien Co.

Will County, Ill., 600 tons, bridge, to Bethlehem Steel Co.

Fargo, N. D., 830 tons, Moorhead bridge, to American Bridge Co.

Moody County, S. D., 175 tons, bridge, to Pittsburgh-Des Moines Steel Co.

Beloit, Wis., 100 tons, addition for Beloit Iron Works, to Milwaukee Bridge Co.

#### WESTERN STATES

Missoula, Mont., 440 tons, highway bridge, to Minneapolis-Moline Power & Implement Co.

Evans, Colo., 450 tons, highway bridge, to E. Burkhardt & Sons Iron & Steel Works Co.

Long Beach, Cal., 165 tons, addition to Lafayette school, to Minneapolis-Moline Power Implement Co.

Seattle, 350 tons, warehouse, to Pacific Car & Foundry Co.

King County, Wash., 168 tons, State undercrossing at Black River Junction, to an unnamed bidder.

#### NEW STRUCTURAL STEEL PROJECTS

##### NORTH ATLANTIC STATES

Londonderry, N. H., 130 tons, State bridge.

Rouses Point, N. Y., 1250 tons, highway bridge over Lake Champlain; bids taken by Lake Champlain Bridge Commission.

Niagara Falls, N. Y., 400 tons, addition to plant of Union Carbide Co.; bids June 8.

Cranford, N. J., 500 tons, high school building.

Jersey City, 1200 tons, recreation building; bids taken by United States Treasury Department.

Reading, Pa., 800 tons, building for Carpenter Steel Co.

#### SOUTH AND SOUTHWEST

Bristol, W. Va., 340 tons, highway bridge.

Mesa, Ariz., 103 tons, State bridge over Boulder Creek; bids June 4.

Port Arthur, Tex., 9750 tons, superstructure of Neches River bridge, contract No. 2; bids June 10.

Woods County, Okla., 700 tons, highway bridge; bids taken June 2.

#### CENTRAL STATES

Delta, Ohio, 225 tons, bridge.

Youngstown, 175 tons, highway bridge.

Warren, Ohio, 250 tons, building for Packard Electric Co.

Dearborn, Mich., 300 tons, steel oven coal bin, Ford Motor Co.

Edwardsville, Ill., 375 tons, highway bridge.

Wanda, Ill., 280 tons, highway bridge.

Chicago, Loop River power project, 900 tons penstocks.

State of Iowa, 1150 tons, highway bridges.

State of Missouri, 775 tons, highway bridges.

Benton County, Mo., 500 tons, highway bridge; bids June 4.

Antigo, Wis., 100 tons, Langlade County bridge; bids close June 10.

#### WESTERN STATES

Cody, Wyo., 460 tons, highway bridge; bids taken by United States Bureau of Public Roads.

Yellowstone National Park, Wyo., 458 tons, bridge for the Bureau of Public Roads; bids June 9.

San Diego, Cal., 450 tons, observatory on Mount Palomar; bids opened.

#### FABRICATED PLATES

##### AWARDS

Utica, N. Y., 280 tons, Richfield Oil Co., four tanks, to Chicago Bridge & Iron Co.

Niagara Falls, N. Y., 110 tons, 54-in. pipe line, to Alco Products Co.

Louisville, Ky., 615 tons, Brown-Forman Distillery Co., 426 ricks, to West Virginia Rail Co.

##### NEW PROJECTS

St. Louis, 500 tons, repairs to gas tanks for Laclede Gas Light Co.

Denver, 100 tons, intake pipe and gates at Moon Lake dam; Lakeside Bridge & Steel Co., low bidder.

Los Angeles, 1442 tons, 24-in. welded pipe for Department of Water and Power; Western Pipe & Steel Co., low bidder.

Los Angeles, 7388 tons, distribution system for Department of Water and Power; P.W.A. Docket No. 1929-R; bids on all remaining units within 90 days.

# IRON AND STEEL SCRAP

... Composite drops to \$12.92, lowest level since November, 1935.

... Markets show signs of steadyng.

... One Buffalo consumer buys 5000 tons; railroad offerings are heavy.

JUNE 2.—On sentiment alone, heavy melting steel has again been scaled down at Pittsburgh and Philadelphia, thus dropping the composite 16c. to a new low level of \$12.92. This is the lowest point for the composite since early last November, but it still compares very favorably with a figure of \$10.83 for the first week in June, 1935.

What the market needs is a little consumer buying. Ever since the first serious price break early in May, there has been practically no interest on the part of mills in new commitments. For this reason, most markets still have a slightly easy undertone, but the first sign of buying would bolster sentiment to a considerable degree. It is unlikely that there will be any widespread buying throughout June and July, but all sellers anticipate a decided pick-up in August.

One consumer has purchased between 2500 and 5000 tons of steel at Buffalo, and other districts report a perceptible return of buying interest. Several railroads are offering sizable lists, and bids for this material should serve to establish the market status, which currently is somewhat nominal.

## Pittsburgh

Lack of consumer sales over the past few weeks, combined with the indifference on the part of mills toward future buying, has again weakened this market. As a result, quotations have been marked down 25c., with No. 1 steel quotable at \$13.75 to \$14.25. Furthermore, cast products and some specialties have also eased off. The Pennsylvania Railroad sale this week may establish a definite trend in scrap prices.

## Chicago

This market is abnormally quiet in

view of the current scale of mill activity. The latter, however, suggests the possibility of renewed buying shortly. Despite the lack of new business, the market is fundamentally strong. Recent purchases of railroad material to cover contract orders were as high as \$1 a ton above current quotations, but were still low enough to allow for a profit at the price at which the sales were made.

## Cleveland

Heavy melting steel has declined 25c. a ton, and compressed steel and No. 1 busheling are off 50c. Also, brokers' bids for blast furnace scrap are 25c. lower. Prices appear steady at present quotations. While scrap is not as plentiful as when higher prices prevailed, the supply is ample. Two consumers in the Youngstown district are regulating shipments. Pennsylvania Railroad will receive bids June 3 on 27,700 tons of scrap, of which 10,000 tons is No. 1 steel, and the New York Central will open tenders the same date for 12,000 tons, including 6100 tons of No. 1 steel.

## Philadelphia

This market continues to drift along and in all probability it will remain featureless for a considerable period. Price sentiment is still on the weaker side, but drastic price reductions have been halted and there is little expectation that current quotations will be altered much over the next month. The Fencoyd melter bid in the June list of compressed bundles offered by the Budd company, which totaled about 1800 tons. These bundles probably went for about \$11 f.o.b., which represents a considerable reduction from the prices quoted for April and May lists. Railroad malleable has been sold at \$16.50 during the week, and the \$12.50 to \$13 price for heavy breakable cast should soon encounter a test.

## Detroit

This market has finally been stabilized at present levels for the past 10

days. The scrap output from auto plants is beginning to decrease as production schedules are lowered. Auto cost is \$1 higher, which is due principally to two large purchases on the part of one automotive and one automotive-parts foundry. The former purchase is said to be speculative.

## Cincinnati

The downward movement of scrap prices appears to have been halted, although a few small sales at less than current quotations have been reported during the week.

## Buffalo

A Buffalo mill has purchased 2500 tons of No. 2 steel at from \$11.50 to \$11.75 a ton. This transaction was the most important development of the past week. Some sellers estimate that the total amount acquired ran as high as 5000 tons. A sale of 250 tons of stove plate at \$11 has been made, and short shoveling steel turnings has been booked at \$8. The largest consumer continues to offer \$12.50 to \$13 for No. 1 steel.

## Boston

The domestic market is virtually at a standstill, except that foundries continue to take small tonnages of textile and No. 1 machinery cast. For export, Nos. 1 and 2 steel remain steady at \$10.50 and \$9.50 a ton respectively, delivered Army Base. A cargo of 4729 tons has left here for Italy. Local exporters are still working on old British Isles contracts, but say no new business is in sight.

## New York

The metropolitan market continues to be dull and featureless. In the absence of test sales, prices remain unchanged. Sellers look for better business before the end of the month, at which time additional foreign and domestic buying is anticipated.

## Canada

Trading in iron and steel scrap for the past week or two has been somewhat specialized, although business generally has been on the upgrade. Local dealers are making schedule shipments of heavy melting and other steel grades to the Hamilton district against contract. Also, Montreal dealers report good demand for steel grades with steady calls for steel axles, carwheels and rails, but supplies of these lines are somewhat limited. Foundries are inquiring for machinery cast, but some dealers state that it is difficult to fill all orders. Malleable scrap is in regular demand, and wrought scrap has shown special activity lately. Other lines are spotty with occasional good sales. Local dealers continue to hold large tonnages of automobile scrap, although a few shipments have been made to United States points recently. Many of the recent purchases by local dealers are going direct to consumers without being taken into yards. Dealers' prices are firm and unchanged.

## Iron and Steel Scrap Prices

### PITTSBURGH

#### Per gross ton delivered consumers' yards:

No. 1 hvy. mltng. steel.	\$13.75 to \$14.25
No. 2 hvy. mltng. steel.	12.25 to 12.75
No. 2 RR. wrought.	13.75 to 14.25
Scrap rails.	14.25 to 14.75
Rails, 3 ft. and under.	16.25 to 16.75
Comp. sheet steel.	13.75 to 14.25
Hand bundled sheets.	12.00 to 13.00
Hvy. steel axle turn.	12.25 to 12.75
Machine shop turn.	9.25 to 9.75
Short shov. turn.	9.50 to 10.00
Mixed bor. turn.	8.25 to 9.25
Cast iron borings.	10.00 to 10.50
Cast iron carwheels.	13.75 to 14.25
Hvy. breakable cast.	12.75 to 13.25
No. 1 cast.	15.00 to 15.50
R.R. knuckles & cprrs.	16.50 to 17.00
Rail. coil & leaf springs.	16.50 to 17.00
Rolled steel wheels.	16.50 to 17.00
Low phos. billet crops.	17.50 to 18.00
Low phos. sh. bar.	17.00 to 17.50
Low phos. punchings.	16.75 to 17.25
Low phos. plate scrap.	17.00 to 17.50
Steel car axles.	15.50 to 16.00

### CLEVELAND

#### Per gross ton delivered consumers' yards:

No. 1 hvy. mltng. steel.	\$13.00 to \$13.50
No. 2 hvy. mltng. steel.	12.00 to 12.50
Comp. sheet steel.	12.00 to 12.50
Light bund. stampings.	9.00 to 9.50
Drop forge flashings.	12.00 to 12.50
Machine shop turn.	7.50 to 8.00
Short shov. turn.	8.00 to 8.50
No. 1 busheling.	12.00 to 12.50
Steel axle turnings.	12.00 to 12.50
Low phos. billet crops.	17.00 to 17.50
Cast iron borings.	8.00 to 8.50
Mixed bor. & turn.	8.00 to 8.50
No. 2 busheling.	8.00 to 8.50
No. 1 cast.	14.50 to 15.00
Railroad grate bars.	8.00 to 8.50
Stove plate.	9.00 to 9.50
Rails under 3 ft.	16.00 to 16.50
Rails for rolling.	16.50 to 17.00
Railroad malleable.	17.00 to 17.50
Cast iron carwheels.	15.50 to 16.00

### PHILADELPHIA

#### Per gross ton delivered consumers' yards:

No. 1 hvy. mltng. steel.	\$12.00
No. 2 hvy. mltng. steel.	11.00
Hydraulic bund. new.	12.00 to 12.50
Hydraulic bund. old.	9.00 to 9.50
Steel rails for rolling.	15.00 to 15.50
Cast iron carwheels.	13.50 to 14.00
Hvy. breakable cast.	12.50 to 13.00
No. 1 cast.	13.50 to 14.00
Stove plate (steel wks.)	10.00 to 10.50
Railroad malleable.	16.50
Machine shop turn.	8.00 to 8.50
No. 1 blast furnace.	6.25
Cast borings.	6.00
Heavy axle turnings.	11.00 to 11.50
No. 1 low phos. hvy.	16.00 to 16.50
Couplers & knuckles.	16.00 to 16.50
Rolled steel wheels.	16.00 to 16.50
Steel axles.	16.00 to 16.50
Shafting.	18.50 to 19.00
No. 1 RR. wrought.	14.50 to 15.00
Spec. iron & steel pipe.	12.00 to 12.50
Bundled sheets.	12.50 to 13.50
No. 1 forge fire.	12.50 to 13.50
Cast borings (chem.).	10.50 to 13.00

### CHICAGO

#### Delivered Chicago district consumers:

Per Gross Ton	
Hvy. mltng. steel.	\$12.50 to \$13.00
Auto. hvy. mltng. steel.	11.00 to 11.50
Shoveling steel.	12.50 to 13.00
Hydraul. comp. sheets.	11.50 to 12.00
Drop forge flashings.	11.50 to 12.00
No. 1 busheling.	11.50 to 12.00
Rolled carwheels.	14.00 to 14.50
Railroad tires cut.	14.00 to 14.50
Railroad leaf springs.	14.00 to 14.50
Axle turnings.	12.00 to 12.50
Steel coup. & knuckles.	14.00 to 14.50
Coil springs.	15.00 to 15.50
Axle turn. (elec.).	12.75 to 13.25
Low phos. punchings.	14.50 to 15.00
Low phos. plates, 12 in. and under.	15.00 to 15.50
Cast iron borings.	6.00 to 6.50
Short shov. turnings.	6.25 to 6.75
Machine shop turn.	5.50 to 6.00
Rerolling rails.	14.00 to 14.50
Steel rails under 3 ft.	14.75 to 15.25
Steel rails under 2 ft.	15.25 to 15.75
Angle bars, steel.	14.50 to 15.00
Cast iron carwheels.	13.50 to 14.00
Railroad malleable.	15.50 to 16.00
Agric. malleable.	13.50 to 14.00

#### Per Net Ton

Iron car axles.	\$17.50 to \$18.00
Steel car axles.	14.25 to 14.75
No. 1 RR. wrought.	11.50 to 12.00
No. 2 RR. wrought.	11.00 to 11.50

### DETROIT

No. 2 busheling, old.	\$7.50 to \$8.00
Locomotive tires.	12.00 to 12.50
Pipes and flues.	8.00 to 8.50
No. 1 machinery cast.	12.00 to 12.50
Clean auto. cast.	11.00 to 11.50
No. 1 railroad cast.	11.00 to 11.50
No. 1 agric. cast.	10.00 to 10.50
Stove plate.	7.00 to 7.50
Grate bars.	8.50 to 9.00
Brake shoes.	8.50 to 9.00

### BUFFALO

Per gross ton, f.o.b. consumers' plants:	
No. 1 hvy. mltng. steel.	\$12.50 to \$13.00
No. 2 hvy. mltng. steel.	11.00 to 11.50
Scrap rails.	12.00 to 12.50
New hvy. b'ndled sheets.	11.00 to 11.50

Old hydraul. bundles.	10.00 to 10.50
Drop forge flashings.	11.00 to 11.50
No. 1 busheling.	11.00 to 11.50
Hvy. axle turnings.	11.50 to 12.00
Machine shop turn.	6.50 to 7.00
Short shov. turnings.	7.75 to 8.25
Cast iron borings.	7.75 to 8.25
No. 2 bushelings.	6.50
Steel car axles.	13.50 to 14.00
Iron axles.	12.00 to 12.50
No. 1 machinery cast.	13.00 to 13.50
No. 1 cupola cast.	12.00 to 12.50
Stove plate.	10.50 to 11.00
Steel rails, under 3 ft.	15.75 to 16.25
Cast iron carwheels.	11.50 to 12.00
Railroad malleable.	16.25 to 16.75
Chemical borings.	9.00 to 9.50

### BIRMINGHAM

#### Per gross ton delivered consumers' yards:

Hvy. melting steel.	\$11.00 to \$11.50
Scrap steel rails.	11.50 to 12.00
Short shov. turnings.	7.00
Stove plates.	8.00
Steel axles.	12.00 to 12.50
Iron axles.	12.00 to 12.50
No. 1 RR. wrought.	8.50 to 9.00
Rails for rolling.	12.50 to 13.00
No. 1 cast.	12.00 to 12.50
Tramcar wheels.	11.00 to 12.00

### ST. LOUIS

#### Dealers' buying prices per gross ton delivered consumers' works:

Selected hvy. steel.	\$12.00 to \$12.50
No. 1 hvy. melting.	12.00 to 12.50
No. 2 hvy. melting.	10.00 to 10.50
No. 1 locomotive tires.	11.00 to 11.50
Misc. stand-sec. rails.	12.50 to 13.00
Railroad springs.	13.50 to 14.00
Bundled sheets.	9.50 to 10.00
No. 2 RR. wrought.	12.00 to 12.50
No. 1 busheling.	7.50 to 8.00
Cast bor. & turn.	4.00 to 4.50
Rails for rolling.	13.50 to 14.00
Machine shop turn.	4.00 to 4.50
Heavy turnings.	9.25 to 9.75
Steel car axles.	13.00 to 13.50
Iron car axles.	15.00 to 16.00
No. 1 RR. wrought.	10.50 to 11.00
Steel rails under 3 ft.	13.50 to 14.00
Steel angle bars.	12.75 to 13.25
Cast iron carwheels.	11.00 to 11.50
No. 1 machinery cast.	11.00 to 11.50
Railroad malleable.	13.50 to 14.00
No. 1 railroad cast.	11.00 to 11.50
Stove plate.	7.50 to 8.00
Agricul. malleable.	12.50 to 13.00

### CINCINNATI

#### Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	\$10.00 to \$10.50
No. 2 hvy. mltng. steel.	8.00 to 8.50
Scrap rails for mltng.	10.50 to 11.00
Loose sheet clippings.	5.75 to 6.25
Bundled sheets.	7.75 to 8.25
Cast iron borings.	5.00 to 5.50
Machine shop turn.	5.75 to 6.25
No. 1 busheling.	8.50 to 9.00
No. 2 busheling.	4.25 to 4.75
Rails for rolling.	11.00 to 11.50
No. 1 locomotive tires.	9.50 to 10.00
Short rails.	14.00 to 14.50
Cast iron carwheels.	10.50 to 11.00
No. 1 machinery cast.	11.50 to 12.00
No. 1 railroad cast.	10.75 to 11.25
Burnt cast.	7.75 to 8.25
Stove plates.	7.75 to 8.25
Agricul. malleable.	9.75 to 10.25
Railroad malleable.	11.50 to 12.00

### DETROIT

#### Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	\$9.50 to \$10.00
No. 2 hvy. mltng. steel.	8.50 to 9.00
Borings and turnings.	5.50 to 6.00
Long turnings.	5.25 to 5.75
Short shov. turnings.	5.75 to 6.25
No. 1 machinery cast.	14.50 to 15.00

### THE CANADA

#### Dealers' buying prices per gross ton:

Toronto	Montreal
Hvy. melting steel.	\$7.50
Rails, scrap.	8.50
Machine shop turn.	4.00
Boiler plate.	7.00
Hvy. axle turnings.	4.50
Cast borings.	5.00
Steel borings.	4.00
Wrought pipe.	4.00
Steel axles.	8.50
Axes, wrought iron.	9.00
No. 1 machinery cast.	11.50
Stove plate.	7.50
Standard carwheels.	11.00
Malleable.	7.00
Shoveling steel.	6.50
Bushelings.	6.00
Compressed sheets.	6.50

### YOUNGSTOWN

#### Per gross ton delivered consumers' yards:

No. 1 hvy. mltng. steel.	\$14.50 to \$15.00
Hydraulic bundles.	14.50 to 15.00
Machine shop turn.	10.00 to 10.50

### NEW YORK

## &lt;h4

## PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

### SEMI-FINISHED STEEL

#### Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are \$2 a ton higher, and delivered Detroit \$3 higher.

#### Per Gross Ton

Rerolling ..... \$28.00  
Forging quality ..... 35.00

#### Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

#### Per Gross Ton

Open-hearth or Bessemer ..... \$28.00

#### Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

#### Per Lb.

Grooved, universal and sheared 1.80c.

#### Wire Rods

(Nos. 4 and 5)

#### Per Gross Ton

F.o.b. Pittsburgh or Cleveland ..... \$38.00  
F.o.b. Chicago, Youngstown or Anderson, Ind. ..... 39.00  
F.o.b. Worcester, Mass. ..... 40.00  
F.o.b. Birmingham ..... 41.00  
F.o.b. San Francisco ..... 47.00  
F.o.b. Galveston ..... 44.00

### BARS, PLATES, SHAPES

#### Iron and Steel Bars

##### Soft Steel

##### Base per Lb.

F.o.b. Pittsburgh ..... 1.85c.  
F.o.b. Chicago or Gary ..... 1.90c.  
F.o.b. Duluth ..... 2.00c.  
Del'd Detroit ..... 2.00c.  
F.o.b. Cleveland ..... 1.90c.  
F.o.b. Buffalo ..... 1.95c.  
Del'd Philadelphia ..... 2.16c.  
Del'd New York ..... 2.20c.  
F.o.b. Birmingham ..... 2.00c.  
F.o.b. cars dock Gulf ports ..... 2.25c.  
F.o.b. cars dock Pacific ports ..... 2.40c.

##### Rail Steel

(For merchant trade)

F.o.b. Pittsburgh ..... 1.70c.  
F.o.b. Cleveland, Chicago, Gary or Moline, Ill. ..... 1.75c.  
F.o.b. Buffalo ..... 1.80c.  
F.o.b. Birmingham ..... 1.85c.  
F.o.b. cars dock Gulf ports ..... 2.10c.  
F.o.b. cars dock Pacific ports ..... 2.25c.

##### Billet Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh ..... 2.05c.  
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham ..... 2.10c.  
Del'd Detroit ..... 2.20c.  
F.o.b. cars dock Gulf ports ..... 2.45c.  
F.o.b. cars dock Pacific ports ..... 2.45c.

##### Rail Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh ..... 1.90c.  
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham ..... 1.95c.  
F.o.b. cars dock Gulf ports ..... 2.30c.  
F.o.b. cars dock Pacific ports ..... 2.30c.

#### Iron

F.o.b. Chicago ..... 1.80c.  
F.o.b. Pittsburgh (refined) ..... 2.10c.  
Delivered New York ..... 2.05c.  
Delivered Philadelphia ..... 2.10c.

#### Cold Finished Bars and Shafting\*

##### Base per Lb.

F.o.b. Pittsburgh ..... 2.10c.  
F.o.b. Cleveland, Chicago and Gary ..... 2.15c.  
F.o.b. Buffalo ..... 2.20c.  
Del'd Detroit ..... 2.30c.  
Del'd eastern Michigan ..... 2.35c.

\*In quantities of 10,000 to 19,999 lb.

### Plates

#### Base per Lb.

F.o.b. Pittsburgh ..... 1.80c.  
F.o.b. Chicago or Gary ..... 1.85c.  
Del'd Cleveland ..... 1.995c.  
F.o.b. Coatesville or Spar. Pt. ..... 1.90c.  
Del'd Philadelphia ..... 1.99c.  
Del'd New York ..... 2.09c.  
F.o.b. Birmingham ..... 1.95c.  
F.o.b. cars dock Gulf ports ..... 2.20c.  
F.o.b. cars dock Pacific ports ..... 2.35c.  
Wrought iron plates, f.o.b. Pittsburgh ..... 3.20c.

### Floor Plates

F.o.b. Pittsburgh ..... 3.35c.  
F.o.b. Chicago ..... 3.40c.  
F.o.b. Coatesville ..... 3.45c.  
F.o.b. cars dock Gulf ports ..... 3.75c.  
F.o.b. cars dock Pacific ports ..... 3.90c.

### Structural Shapes

#### Base per Lb.

F.o.b. Pittsburgh ..... 1.80c.  
F.o.b. Chicago ..... 1.85c.  
Del'd Cleveland ..... 1.995c.  
F.o.b. Buffalo or Bethlehem ..... 1.90c.  
Del'd Philadelphia ..... 2.015c.  
Del'd New York ..... 2.0625c.  
F.o.b. Birmingham (standard) ..... 1.95c.  
F.o.b. cars dock Gulf ports ..... 2.20c.  
F.o.b. cars dock Pacific ports ..... 2.35c.

### Steel Sheet Piling

#### Base per Lb.

F.o.b. Pittsburgh ..... 2.15c.  
F.o.b. Chicago or Buffalo ..... 2.25c.  
F.o.b. cars dock Gulf or Pacific Coast ports ..... 2.60c.

### RAILS AND TRACK SUPPLIES

#### F.o.b. Mill

Standard rails, heavier than 60 lb. per gross ton ..... \$36.37 1/2  
Angle bars, per 100 lb. ..... 2.55

#### F.o.b. Code Basing Points

Light rails (from billets) per gross ton ..... \$35.00  
Light rails (from rail steel) per gross ton ..... 34.00

#### Base per 100 Lb.

Spikes ..... 2.60  
Tie plates, steel ..... 1.90  
Tie plates, Pacific Coast ports ..... 2.00  
Track bolts, to steam railroads ..... 3.60  
Track bolts, to jobbers, all sizes (per 100 counts) 70 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Buffalo, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa.; on spikes alone, Cleveland, Youngstown, Lebanon, Pa., Columbia, Pa., Richmond, Va.

### SHEETS, STRIP, TIN PLATE,

#### TERNE PLATE

#### Sheets

##### Hot Rolled

##### Base per Lb.

No. 10, f.o.b. Pittsburgh ..... 1.85c.  
No. 10, f.o.b. Gary ..... 1.95c.  
No. 10, del'd Detroit ..... 2.05c.  
No. 10, f.o.b. Philadelphia ..... 2.16c.  
No. 10, f.o.b. Birmingham ..... 2.00c.  
No. 10, f.o.b. cars dock Pacific ports ..... 2.40c.

##### Hot Rolled Annealed

No. 24, f.o.b. Pittsburgh ..... 2.40c.  
No. 24, f.o.b. Gary ..... 2.50c.  
No. 24, del'd Detroit ..... 2.45c. to 2.60c.  
No. 24, del'd Philadelphia ..... 2.71c.

No. 24, f.o.b. Birmingham ..... 2.55c.  
No. 24, f.o.b. cars dock Pacific ports ..... 3.05c.  
No. 24, wrought iron, Pittsburgh ..... 4.30c.

### Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh ..... 2.50c.  
No. 10 gage, f.o.b. Gary ..... 2.60c.  
No. 10 gage, f.o.b. Detroit ..... 2.70c.  
No. 10 gage, del'd Philadelphia ..... 2.81c.  
No. 10 gage, f.o.b. Birmingham ..... 2.65c.  
No. 10 gage, f.o.b. cars dock Pacific ports ..... 3.10c.

### Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh ..... 2.95c.  
No. 20 gage, f.o.b. Gary ..... 3.05c.  
No. 20 gage, del'd Philadelphia ..... 3.15c.  
No. 20 gage, del'd Birmingham ..... 3.26c.  
No. 20 gage, f.o.b. cars dock Pacific ports ..... 3.50c.

### Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh ..... 3.10c.  
No. 24, f.o.b. Gary ..... 3.20c.  
No. 24, del'd Philadelphia ..... 3.41c.  
No. 24, f.o.b. Birmingham ..... 3.25c.  
No. 24, f.o.b. cars dock Pacific ports ..... 3.70c.  
No. 24, wrought iron, Pittsburgh ..... 4.95c.

### Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh ..... 3.40c.  
F.o.b. Gary ..... 3.50c.  
F.o.b. cars dock Pacific ports ..... 4.10c.

### Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh ..... 2.95c.  
No. 20, f.o.b. Gary ..... 3.05c.  
No. 20, f.o.b. Birmingham ..... 3.55c.  
No. 20, f.o.b. cars dock Pacific ports ..... 3.55c.

### Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh ..... 2.75c.  
No. 28, f.o.b. Gary ..... 2.85c.  
No. 28, f.o.b. cars dock Pacific ports ..... 3.35c.

### Tin Plate

#### Base per Box

Standard cokes, f.o.b. Pittsburgh district mill ..... \$5.25  
Standard cokes, f.o.b. Gary ..... 5.35  
Standard cokes, f.o.b. cars dock Pacific ports ..... 5.90

### Terne Plate

#### (F.o.b. Pittsburgh)

(Per Package, 20 x 28 in.)  
8-lb. coating I.C. ..... \$10.00  
15-lb. coating I.C. ..... 12.00  
20-lb. coating I.C. ..... 13.00  
25-lb. coating I.C. ..... 14.00  
30-lb. coating I.C. ..... 15.25  
40-lb. coating I.C. ..... 17.50

### Hot-Rolled Hoops, Bands, Strips and Flats under 1/4 In.

#### Base per Lb.

All widths up to 24 in., P'gh ..... 1.85c.  
All widths up to 24 in., Chicago ..... 1.95c.  
All widths up to 24 in., del'd Detroit ..... 2.05c.  
All widths up to 24 in., Birmingham ..... 2.00c.  
Cooperage stock, Pittsburgh ..... 1.95c.  
Cooperage stock, Chicago ..... 2.05c.

### Cold-Rolled Strips\*

#### Base per Lb.

F.o.b. Pittsburgh ..... 2.60c.  
F.o.b. Cleveland ..... 2.60c.  
Del'd Chicago ..... 2.89c.  
F.o.b. Worcester ..... 2.80c.

\* Carbon 0.25 and less.

### Fender Stock

No. 14, Pittsburgh or Cleveland ..... 2.90c.  
No. 14, Worcester ..... 3.30c.  
No. 20, Pittsburgh or Cleveland ..... 3.30c.  
No. 20, Worcester ..... 3.70c.

## WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade  
Per Lb.

Bright wire ..... 2.40c.  
Spring wire ..... 3.05c.

Chicago prices on products sold to the manufacturing trade are \$1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are \$2 a ton above, Birmingham \$3 above, and Pacific Coast prices \$9 a ton above Pittsburgh or Cleveland.

To the Trade

Base per Keg

Standard wire nails ..... \$2.10  
Smooth coated nails ..... 2.10

Base per 100 Lb.

Annealed fence wire ..... \$2.65  
Galvanized fence wire ..... 3.00  
Polished staples ..... 2.80  
Galvanized staples ..... 3.05  
Barbed wire, galvanized ..... 2.60  
Twisted barbless wire ..... 2.60  
Woven wire fence, base column ..... 58  
Single loop bale ties, base column ..... 51

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is \$2 above Pittsburgh); Duluth, Minn., mill prices are \$2 a ton over Pittsburgh except for woven wire fence, which is \$3 over Pittsburgh and Birmingham mill prices are \$3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are \$6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of \$6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

## STEEL AND WROUGHT IRON PIPE AND TUBING

### Welded Pipe

Base Discounts, f.o.b. Pittsburgh  
District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought  
iron pipe.

### Butt Weld

Steel	Wrought Iron		
In.	Black Galv.	In.	Black Galv.
1/8	57	37	1/8 +91 1/2 +138
1/4 to 3/8	60	44 1/2	1/4 & 1/8 +116 +21 1/2
1/2	64 1/2	55	1/2 31 1/2 15
3/4	67 1/2	59	3/4 36 1/2 20 1/2
1 to 3	69 1/2	61 1/2	1 & 1/4 39 1/2 25 1/2
			1/2 43 1/2 28
		2	41 1/2 26

### Lap Weld

2	62	53 1/2	2	37	22 1/2
2 1/2 to 3.65	56 1/2	2 1/2 to 3 1/2	38	25	
3 1/2 to 6.67	58 1/2	4 to 8	40	28 1/2	
7 & 8.66	56 1/2	9 to 12	38	24 1/2	
9 & 10.65	56				
11 & 12.64	55				

Butt Weld, extra strong, plain ends					
1/8	55 1/2	42 1/2	1/8	+13	+45 1/2
1/4 to 3/8	57 1/2	46 1/2	1/4 & 1/8	+2 1/2 +34 1/2	
1/2	62 1/2	54 1/2	1/2	32 1/2	17 1/2
3/4	66 1/2	58 1/2	3/4	37 1/2	22 1/2
1 to 3	68	61	1 to 2	43 1/2	29

Lap Weld, extra strong, plain ends					
2	60	52 1/2	2	40	26
2 1/2 to 3.64	56 1/2	2 1/2 to 4	45 1/2	33	
3 1/2 to 6.67	60	4 1/2 to 6	45	33 1/2	
7 & 8.66	57	7 & 8	46	33	
9 & 10.65	56	9 to 12	41 1/2	30	
11 & 12.64	55				

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

### Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes  
(Net base prices per 100 ft. f.o.b. Pittsburgh  
in carload lots)

	Cold	Drawn	Hot
1 in. o.d.	13 B.W.G.	\$ 8.60	\$ 7.82
1 1/2 in. o.d.	13 B.W.G.	10.19	9.26
2 in. o.d.	13 B.W.G.	11.26	10.23
2 1/2 in. o.d.	13 B.W.G.	12.81	11.64
3 in. o.d.	13 B.W.G.	14.35	13.04
3 1/2 in. o.d.	13 B.W.G.	16.00	14.54
4 in. o.d.	12 B.W.G.	17.61	16.01
4 1/2 in. o.d.	12 B.W.G.	19.29	17.54
5 in. o.d.	12 B.W.G.	20.45	18.59

3 in. o.d.	12 B.W.G.	\$21.45	\$19.50
4 1/2 in. o.d.	10 B.W.G.	41.08	37.35
5 in. o.d.	11 B.W.G.	27.09	24.62
6 in. o.d.	10 B.W.G.	33.60	30.54
7 in. o.d.	10 B.W.G.	41.08	37.35
8 in. o.d.	9 B.W.G.	51.56	46.87
9 in. o.d.	7 B.W.G.	79.15	71.90

Extra for less-carload quantities:

25,000 lb. or ft. to 39,999 lb. or ft.	5 %
12,000 lb. or ft. to 24,999 lb. or ft.	12 1/4 %
6,000 lb. or ft. to 11,999 lb. or ft.	25 %
2,000 lb. or ft. to 5,999 lb. or ft.	35 %
Under 2,000 lb. or ft.	50 %

## CAST IRON WATER PIPE

Per Net Ton

*6-in. and larger, del'd Chicago	\$48.40
6-in. and larger, del'd New York	45.20
*6-in. and larger, Birmingham	40.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	48.00
F.o.b. dock, Seattle	48.50
F.o.b. dock, Seattle	51.50
Class "A" and gas pipe, \$3 extra.	
4-in. pipe is \$3 a ton above 6-in.	

\* Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$39, Birmingham, and \$47.40, delivered Chicago and 4-in. pipe, \$42, Birmingham, and \$50.40 a ton, delivered Chicago.

## BOLTS, NUTS, RIVETS, SET SCREWS

### Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:	
1/2 in. x 6 in. and smaller	70, 10 and 5
Larger than 1/2 in.	70 and 10
Lag bolts	70 and 10
Flow bolts, Nos. 1, 2, 3, and 7 heads	70 and 10
Hot-pressed nuts, blank or tapped, square	70 and 10
Hot-pressed nuts, blank or tapped, hexagon	70 and 10
C.p.c. and t. square or hex. nuts, blank or tapped	70 and 10
Semi-finished hexagon nuts, U.S.S. and S.A.E., all sizes	60, 20 and 15
Stove bolts in packages, nuts attached	72 1/2, 10, 10 and 5
Stove bolts in packages, with nuts separate	72 1/2, 10, 10 and 5
Stove bolts in bulk	82 1/2
Tire bolts	55

On stove bolts freight is allowed to destination on 200 lb. and over.

### Large Rivets

(1/2-in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh or Cleveland \$2.90  
F.o.b. Chicago or Birmingham 3.00

### Small Rivets

(7/16-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh	70 and 5
F.o.b. Cleveland	70 and 5
F.o.b. Chicago and Birm'g'm.	70 and 5

### Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lbs. on lots of 200 lb. or more) Per Cent Off List

Milled cap screws, 1 in. dia. and smaller	80, 10, and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75
Milled headless set screws, cut thread 3/4 in. and smaller	75
Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	85
Upset set screws, cut and oval points	75 and 10
Milled studs	65 to 65 and 10

Base price, \$49 a gross ton.

### Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton. Open-hearth grade, base \$2.45c. Delivered price at Detroit is \$2.60c.

## S.A.E. Series Numbers

Alloy Differential per 100 lb.

2000 (2 1/2% Nickel) \$0.25

2100 (2 1/2% Nickel) 0.95

2300 (3 1/2% Nickel) 1.50

2500 (5% Nickel) 2.25

3100 Nickel Chromium 0.55

3200 Nickel Chromium 1.35

3300 Nickel Chromium 3.80

3400 Nickel Chromium 3.20

4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum) 0.50

4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum) 0.70

4600 Nickel Molybdenum (0.20 to 0.30) Molybdenum (1.50 to 2.00 Nickel) 1.05

5100 Chromium Steel (0.60 to 0.90 Chromium) 0.35

5100 Chromium Steel (0.80 to 1.10 Chromium) 0.45

5100 Chromium Spring Steel base

6100 Chromium Vanadium Bar 1.10c.

6100 Chromium Vanadium

Spring Steel \$0.70

Chromium Nickel Vanadium 1.40

Carbon Vanadium 0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars 2 1/2c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

## Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 2.95c. base per lb.

## STAINLESS STEEL NO. 302

(17 to 19% Cr, 7 to 9% Ni, 0.08 to 0.20% C.)

(Base Prices f.o.b. Pittsburgh)

Per Cent Off List

	Per Lb.
Forging billets	19.55c.
Bars	23c.
Plates	26c.
Structural shapes	23c.
Sheets	33c.
Hot-rolled strip	20 1/2c.
Cold-rolled strip	27c.
Drawn wire	23c.

## TOOL STEEL

Base per Lb.

High speed 55c.

High carbon chrome 35

## IRON AND STEEL WAREHOUSE PRICES

### PITTSBURGH

	Base per Lb.
Plates	3.15c.
Structural shapes	3.15c.
Soft steel bars and small shapes	2.95c.
Reinforcing steel bars	2.95c.
Cold-finished and screw stock:	
Rounds and hexagons	3.35c.
Squares and flats	3.35c.
Hoops and bands under $\frac{1}{4}$ in.	3.20c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.30c.
Galv. sheets (No. 24), 25 or more bundles	3.95c.
Hot-rolled sheets (No. 10)	2.95c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	\$3.69
Spikes, large	3.10c.
Track bolts, all sizes, per 100 count	.65 per cent off list
Machine bolts, 100 count	.65 per cent off list
Carriage bolts, 100 count	.65 per cent off list
Nuts, all styles, 100 count	.65 per cent off list
Large rivets, base per 100 lb.	\$3.80
Wire, black, soft ann'l'd, base per 100 lb.	2.90c.
Wire, galv. soft, base per 100 lb.	3.25c.
Common wire nails, per keg	2.35c.
Cement coated nails, per keg	2.35c.

On plates, structural, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.

\*Delivered in Pittsburgh switching district.

### CHICAGO

	Base per Lb.
Plates and structural shapes	3.20c.
Soft steel bars, rounds	3.00c.
Soft steel bars, squares and hexagons	3.15c.
Cold-fin. steel bars:	
Rounds and hexagons	3.50c.
Flats and squares	3.50c.
Hot-rolled strip	3.30c.
Hot-rolled annealed sheets (No. 24)	3.85c.
Galv. sheets (No. 24)	4.55c.
Hot-rolled sheets (No. 10)	3.05c.
Spikes (keg lots)	3.50c.
Track bolts (keg lots)	4.65c.
Rivets, structural (keg lots)	3.65c.
Rivets, boiler (keg lots)	3.75c.

#### Per Cent Off List

Machine bolts	*70
Carriage bolts	*70
Lag screws	*70
Hot-pressed nuts, sq. tap or blank	*70
Hot-pressed nuts, hex. tap or blank	*70
Hex. head cap screws	87½
Cut point set screws	.75 and 10
Flat head bright wood screws	70
Spring coppers	55
Stove bolts in full packages	70
Rd. hd. tank rivets, 7/16 in. and smaller	57½
Wrought washers	\$4.50 off list
Black ann'l'd wire per 100 lb.	\$3.85
Common wire nails, base per keg	2.95c.
Cement c't'd nails, base per keg	2.95c.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

\*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 65 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

\*Prices for city and suburbs only.

### NEW YORK

	Base per Lb.
Plates, $\frac{1}{4}$ in. and heavier	3.40c.
Structural shapes	3.37c.
Soft steel bars, rounds	3.31c.
Iron bars	3.31c.
Iron bars, Swed. char-coal	6.75c. to 7.00c.

### COLD-FIN. SHAFTING AND SCREW STOCK

Rounds and hexagons	3.81c.
Flats and squares	3.81c.
Cold-rolled; strip, soft and quarter hard	3.36c.
Hoops	3.56c.
Bands	3.56c.
Hot-rolled sheets (No. 10)	3.31c.
Hot-rolled ann'l'd sheets (No. 24*)	3.89c.
Galvanized sheets (No. 24*). Special	
Long terne sheets (No. 24)	5.25c.
Standard tool steel	11.00c.
Wire, black annealed (No. 10)	3.40c.
Wire, galv. (No. 10)	3.75c.
Tire steel, 1 x $\frac{1}{4}$ in. and larger	3.75c.
Open-hearth spring steel	4.00c. to 10.00c.
Common wire nails, base per keg	\$3.21

#### PER CENT OFF LIST

Machine bolts, square head and nut:	
All diameters	.65 and 10
Carriage bolts, cut thread:	
All diameters	.65 and 10
Boiler tubes:	
Per 100 Ft.	
Lap welded, 2-in.	\$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

\*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

### ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.45c.
Bars, soft steel (rounds and flats)	3.25c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	3.40c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Hot-rolled annealed sheets (No. 24)	4.10c.
Galv. sheets (No. 24)	4.65c.
Hot-rolled sheets (No. 10)	3.30c.
Black corrug. sheets (No. 24)	4.10c.
*Galv. corrug. sheets	4.65c.
Structural rivets	4.00c.
Boiler rivets	4.10c.

#### PER CENT OFF LIST

Tank rivets, 7/16 in. and smaller	.55
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities	.70
*No. 26 and lighter take special prices.	

### PHILADELPHIA

	Base per Lb.
*Plates, $\frac{1}{4}$ -in. and heavier	2.98c.
*Structural shapes	2.98c.
*Soft steel bars, small shapes, iron bars (except bands)	3.03c.
*Reinforc. steel bars, sq. twisted and deformed	2.96c.
Cold-finished steel bars	2.76c.
*Steel hoops	3.43c.
*Steel bands, No. 12 and 3/16 in. incl.	3.18c.
Spring steel	5.90c.
*Hot-rolled anneal. sheets (No. 24)	3.65c.
*Galvanized sheets (No. 24)	4.40c.
*Hot-rolled annealed sheets (No. 10)	3.05c.
Diam. pat. floor plates, $\frac{1}{4}$ in.	4.95c.
Swedish iron bars	6.25c.

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.

\*Base prices subject to deduction on orders aggregating 4000 lb. or over.

\*For 25 bundles or over.

\*For less than 2000 lb.

### CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.31c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.10c.
*Cold-finished steel bars	3.50c.
Flat-rolled steel under $\frac{1}{4}$ in.	3.35c.
Cold-finished strip	\$3.00c.

Hot-rolled annealed sheets (No. 24)	3.91c.
Galvanized sheets (No. 24)	4.61c.
Hot-rolled sheets (No. 10)	3.11c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.56c.
*Black ann'l'd wire, per 100 lb.	\$2.40
*No. 9 galv. wire, per 100 lb.	2.75
*Com. wire nails, base per keg	2.35

\*Outside delivery 10c. less.

\*For 5000 lb. or less.

### CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.42c.
Bars, rounds, flats and angles	3.22c.
Other shapes	3.37c.
Rail steel reinforc. bars	3.25c.
Hoops and bands, 3/16 in. and lighter	3.47c.
Cold-finished bars	3.72c.
Hot-rolled annealed sheets (No. 24)	4.02c.
Galv. sheets (No. 24) 500 lb. or less	4.47c.
Galvanized sheets (No. 24) over 500 lb.	4.07c.
Hot-rolled sheets (No. 10)	3.22c.
Structural rivets	4.35c.
Small rivets	.55 per cent off list
No. 9 ann'l'd wire, per 100 lb.	(1000 lb. or over) \$2.88
Com. wire nails, base per keg	
Any quantity less than carload	3.04
Cement c't'd nails, base 100-lb. keg	3.50
Chain. lin. per 100 lb.	8.35

#### Net per 100 Ft.

Seamless steel boiler tubes, 2-in.	\$20.37
4-in.	48.14
Lap-welded steel boiler tubes, 2-in.	4.35c.
4-in.	8.35

### BUFFALO

	Base per Lb.
Plates	2.38c.
Struc. shapes	3.25c.
Soft steel bars	3.05c.
Reinforcing bars	2.60c.
Cold-fin. flats and sq.	3.55c.
Rounds and hex.	3.55c.
Cold-rolled strip steel	3.19c.
Hot-rolled annealed sheets (No. 24)	4.06c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.43c.
Galv. sheets (No. 24)	4.70c.
Bands	3.43c.
Hoops	3.43c.
Heavy hot-rolled sheets	3.18c.
Com. wire nails, base per keg	\$3.10
Black wire, base per 100 lb.	
(2500-lb. lots or under) .....	4.00
(Over 2500 lb.) .....	3.90

### BOSTON

	Base per Lb.
Beams, channels, angles, tees, zees</td	

### DETROIT

#### Base per Lb.

Soft steel bars	3.09c.
Structural shapes	3.42c.
Plates	3.42c.
Floor plates	5.17c.
Hot-rolled annealed sheets (No. 24)	3.94c.
Hot-rolled sheets (No. 10)	3.14c.
Galvanized sheets (No. 24)**	4.72c.
Bands	3.39c.
Hoops	3.39c.
†Cold-finished bars	3.64c.
Cold-rolled strip	3.18c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	5.29c.*
Bolts and nuts, in cases, 70 and 10 per cent off list	
Broken cases	70 per cent off

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials.

\*Price applies to 1,000 lb. and over.

†With reduction in chemical extras.

\*\*0.25c. off list for 10 to 25 bundles; 0.50c. for 25 bundles and over, Detroit delivery only.

### MILWAUKEE

#### Base per Lb.

Plates and structural shapes..	3.31c.
Soft steel bars, rounds up to 8 in., flats and fillet angles...	3.11c.
Soft steel bars, squares and hexagons .....	3.26c.
Hot-rolled strip .....	3.41c.
Hot-rolled sheets (No. 10) .....	3.16c.
Hot-rolled annealed 3/16—24 in. to 48 in. wide incl. ....	3.41c.
Hot-rolled annealed sheets (No. 24) .....	3.96c.
Galvanized sheets (No. 20) .....	4.66c.
Cold-finished steel bars.....	3.61c.
Cold-rolled strip .....	3.33c.
Structural rivets (keg lots) ..	3.86c.
Boiler rivets, cone head (keg lots) .....	3.96c.
Track spikes (keg lots) .....	3.91c.
Track bolts (keg lots) .....	4.91c.
Black annealed wire .....	3.40c.
Com. wire nails .....	2.60c.
Cement coated nails .....	2.60c.

#### Per Cent Off List

Machine bolts, 1/2x6 and smaller...	70
Larger than 1/2x6.....	65 and 10
Hot-pressed nuts, sq. and hex. tapped or blank (keg lots)	
65 and 10	

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

### ST. PAUL

#### Base per Lb.

Mild steel bars, rounds .....	3.25c.
Structural shapes .....	3.45c.
Plates .....	3.45c.
Cold-finished bars .....	4.02c.
Bands and hoops .....	3.55c.
Hot-rolled annealed sheets, No. 24 .....	3.90c.
Galvanized sheets, No. 24.....	4.50c.
Cold-rolled sheets, No. 20 .....	4.95c.

On mild steel bars, shapes, plates and hoops and bands the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

### BALTIMORE

#### Base per Lb.

*Mild steel bars .....	3.00c.
**Reinforcing bars .....	2.85c.
*Structural shapes .....	3.00c.
†Plates .....	3.00c.
†Hot-rolled sheets, No. 10.....	3.10c.
†Hot-rolled annealed sheets, No. 24 .....	3.60c.
†Galvanized sheets, No. 24.....	4.30c.
*Bands .....	3.20c.
*Hoops .....	3.45c.
†Cold-rolled rounds .....	3.73c.
†Cold-rolled squares, hex. and flats .....	3.73c.
Rivets .....	4.40c.
Bolts and nuts, per cent off list	60 and 10

\*Quantity extras per size apply.  
†Quantity extras per thickness apply.  
Hot-rolled quantity extras are: 2000  
lb. and over, base: 1500 lb. to 1999 lb.  
add 15c. per 100 lb.; 1000 lb. to 1499  
lb. add 30c.; 0 to 999 lb. add 50c.  
‡25 bundles and over, base. For 1  
to 9 bundles add 50c. per 100 lb.; for  
10 to 24 bundles add 25c.  
§Base for 1000 lb. and over. For  
500 to 999 lb. add 25c. per 100 lb.;  
for 300 to 499 lb. add \$1.00; for 0 to  
299 lb. add \$1.75; for combined order  
under 100 lb. add \$3.00.

\*For orders 4000 lb. to 9999 lb.  
Add 15c. per 100 lb. for orders 2000  
to 3999 lb.; add 65c. for orders less  
than 2000 lb.

### PACIFIC COAST

#### Base per Lb.

San Fran.	Los Angeles	Seattle
Plates, tank and		
U. M. ....	3.25c.	3.60c. 3.80c.
Shapes, standard	3.25c.	3.60c. 3.80c.
Soft steel bars..	3.25c.	3.60c. 3.95c.
Reinforcing bars, f.o.b. cars dock		
Pacific ports..	2.45c.	2.45c. 2.45c.
Hot-rolled annealed sheets (No. 24) ....	4.10c.	4.35c. 4.40c.
Hot-rolled sheets (No. 10) ....	3.35c.	3.70c. 3.75c.
Galv. sheets (No. 24 and lighter)	4.50c.	4.40c. 5.00c.
Galv. sheets (No. 22 and heavier)	5.00c.	4.60c. 5.00c.
Cold finished steel		
Rounds ...	5.80c.	5.85c. 6.00c.
Squares and hexagons.	7.05c.	7.10c. 7.25c.
Flats .....	7.55c.	7.60c. 8.25c.
Common wire nails—base per keg less carload	\$2.90	\$2.90 \$2.90

All items subject to differentials  
for quantity.

### REFRACTORIES PRICES

#### Fire Clay Brick

##### Per 1000 f.o.b. Works

High-heat duty, Pennsylvania, Maryland, Kentucky, Missouri and Illinois .....	\$45.00
High-heat duty, New Jersey...	50.00
High-heat duty, Ohio .....	40.00
Intermediate, Pennsylvania, Maryland, Kentucky, Mis- souri and Illinois .....	40.00
Intermediate, New Jersey.....	43.00
Intermediate, Ohio .....	35.00
Ground fire clay, per ton.....	7.00

#### Silica Brick

##### Per 1000 f.o.b. Works

Pennsylvania .....	\$45.00
Chicago District .....	54.00
Birmingham .....	\$48.00 to 50.00
Silica cement per net ton.....	8.00

#### Chrome Brick

##### Per Net Ton

Standard f.o.b Baltimore, Plym- outh Meeting and Chester....	\$45.00
Chemically bonded f.o.b. Balti- more, Plymouth Meeting and Chester, Pa.....	45.00

#### Magnesite Brick

##### Per Net Ton

Standard, f.o.b. Baltimore and Chester, Pa.....	\$65.00
Chemically bonded, f.o.b. Balti- more .....	55.00

#### Grain Magnesite

##### Per Net Ton

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks).....	\$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks.....	40.00
Domestic, f.o.b. Chewelah, Wash. 22.00	

## RAW MATERIALS PRICES

### PIG IRON

#### No. 2 Foundry

F.o.b. Everett, Mass.; Bethlehem, Birdsboro and Swedesland, Pa., and Sparrows Point, Md.	\$20.50
Delivered Brooklyn	22.9289
Delivered Newark or Jersey City	21.9873
Delivered Philadelphia	21.3132
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	19.50
F.o.b. Jackson, Ohio	21.25
Delivered Cincinnati	20.5807
F.o.b. Duluth	20.00
F.o.b. Provo, Utah	17.50
Delivered San Francisco, Los Angeles or Seattle	22.315
F.o.b. Birmingham*	15.50

\* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point.

#### Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

#### Basic

F.o.b. Everett, Mass.; Bethlehem, Birdsboro, Swedesland and Steelton, Pa., and Sparrows Point, Md.	\$20.00
Delivered Boston Switching District	20.50
Delivered Newark or Jersey City	21.4873
Delivered Philadelphia	20.8132
F.o.b. Buffalo	18.50
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	19.00
Delivered Cincinnati	20.0807
Delivered Canton, Ohio	20.3482
Delivered Mansfield, Ohio	20.8832
F.o.b. Jackson, Ohio	20.75
F.o.b. Provo, Utah	17.00
F.o.b. Birmingham	14.50

#### Bessemer

F.o.b. Everett, Mass.; Bethlehem, Birdsboro and Swedesland, Pa.	\$21.50
Delivered Boston Switching District	22.00
Delivered Newark or Jersey City	22.9873
Delivered Philadelphia	22.3132
F.o.b. Buffalo and Erie, Pa., and Duluth	20.50
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Birmingham	20.00
Delivered Cincinnati	21.0807
Delivered Canton, Ohio	21.3482
Delivered Mansfield, Ohio	21.8832

#### Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.

#### Gray Forge

Valley or Pittsburgh furnace

#### Charcoal

Lake Superior furnace

Delivered Chicago

#### Canadian Pig Iron

##### Per Gross Ton

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$21.00
No. 2 fdy., sil. 1.75 to 2.75	20.50
Malleable	22.50
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	\$22.50
No. 2 fdy., sil. 1.75 to 2.25	22.00
Malleable	22.50
Basic	22.00

### FERROALLOYS

#### Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.	Per Gross Ton
Domestic, 80% (carload)	\$75.00

#### Spiegeleisen

Per Gross Ton Furnace	
Domestic, 19 to 21%	\$26.00
50-ton lots 3-mo. shipment	24.00

F.o.b. New Orleans

#### Electric Ferrosilicon

Per Gross Ton Delivered	
50% (carloads)	\$77.50
50% (ton lots)	85.00
75% (carloads)	126.00
75% (ton lots)	130.00

#### Silvery Iron

Per Gross Ton	
F.o.b. Jackson, Ohio, 6.00 to 6.50%	\$22.75
For each additional 0.5% silicon up to 12%, 50c. a ton is added.	

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese 2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

#### Bessemer Ferrosilicon

##### F.o.b. Jackson, Ohio, Furnace

Per Gross Ton	Per Gross Ton
10.00 to 10.50%	\$27.75   13%   \$31.75
10.51 to 11.00%	28.25   14%   33.25
11.00 to 11.50%	28.75   15%   34.75
11.51 to 12.00%	29.25   16%   36.25
12%	30.25   17%   37.75

Manganese 2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

#### Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads

Ferrotungsten, lots of 5000 lb.

Ferrotungsten, smaller lots

Ferrochromium, 4 to 6% carbon

and up, 65 to 70% Cr per lb.

contained Cr delivered, in car-

loads, and contract

Ferrochromium, 2% carbon

carbon

Ferrochromium, 1% carbon

Ferrochromium, 0.10% carbon

Ferrochromium, 0.06% carbon

Ferrovanadium, del. per lb. contained V

Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.

Ferrocobaltitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace

carload and contract per net ton

Ferrocobaltitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton

Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton

Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with \$3 unitage, freight equalized with Nashville, Tenn., delivered.

Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with \$3 unitage, freight equalized with Nashville, Tenn., delivered.

Ferromolybdenum, per lb. Mo del.

Calcium molybdate, per lb. Mo del.

Silico spiegel, per ton, f.o.b. furnace, carloads

Ton lots or less, per ton

Silico-manganese, gross ton, delivered.

2.50% carbon grade

2% carbon grade

1% carbon grade

Spot prices

\$5 a ton higher

### ORES

#### Lake Superior Ores

##### Delivered Lower Lake Ports

##### Per Gross Ton

Old range, Bessemer	51.50%	\$4.80
Old range, non-Bessemer	51.50%	4.65
Mesabi, Bessemer	51.50%	4.65
Mesabi, non-Bessemer	51.50%	4.50
High phosphorus, 51.50%		4.40

#### Foreign Ore

##### C.i.f. Philadelphia or Baltimore

##### Per Unit

Iron, low phos., copper free, 55 to 58% dry	Spain or Algeria	10.25c.
Iron, low phos., Swedish, average, 68 1/2% iron		10.25c.
Iron, basic or foundry, Swedish, aver-		9.50c.
Iron, basic or foundry, Russian, aver-		9.50c.
Iron, basic or foundry, Caucasian, washed	52%	26c.
Iron, African, Indian, 44-48%	25c.	
Iron, African, Indian, 49-51%	26c.	
Iron, Brazilian, 46 to 48 1/2%	24c.	

##### Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid	delivered, nominal	16.00
Chrome, 45% Cr <sub>2</sub> O <sub>3</sub> , lamp, c.i.f.	Atlantic Seaboard (African)	\$17.50

##### Per Gross Ton

Chrome, 45% Cr <sub>2</sub> O <sub>3</sub> , lamp, c.i.f.	Atlantic Seaboard (African)	\$17.50
45 to 46% Cr <sub>2</sub> O <sub>3</sub> (Turkish)		17.00

##### 48% Cr<sub>2</sub>O<sub>3</sub> (African)

##### 48% min. Cr<sub>2</sub>O<sub>3</sub> (Turkish)

Chrome concentrate, 50% and over Cr <sub>2</sub> O <sub>3</sub>	c.i.f. Atlantic ports	22.00
52% Cr <sub>2</sub> O <sub>3</sub> (Turkish)		21.75
48 to 49% Cr <sub>2</sub> O <sub>3</sub> (Turkish)		19.25

### FLUORSPAR

##### Per Net Ton

Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail		\$18.00
Domestic, barge and rail		19.00

No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines		20.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f.		21.50

Atlantic ports, duty paid		21.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/2% silicon, f.o.b. Illinois and Kentucky mines		35.00

### FUEL OIL

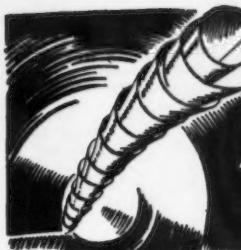
##### Per Gal.

F.o.b. Bayonne or Baltimore, No. 3 distillate		4.25c.
F.o.b. Bayonne or Baltimore, No. 4 industrial		3.75c.

Del'd Ch'go, No. 3 industrial		5.00c.
F.o.b. Cleveland, No. 3 distillate		6.00c.

F.o.b. Cleveland, No. 5 industrial		5.00c.
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### COKE AND COAL



## THIS WEEK'S MACHINE TOOL ACTIVITIES

... Cincinnati has heavy-work parts-contracts.

• • •

... Order backlogs point to well sustained call for skilled mechanics.

• • •

... Greater machine tool familiarity will defeat anti-machine propaganda.

• • •  
By L. M. WAITE  
• • •

**M**ANUFACTURERS who were fortunate enough to be represented at the recent Pacific Coast machine tool show, put on by Charles E. Moore, president, Moore Machinery Co., 550 Fifth Street, San Francisco, are still recording splendid results, held to be a development of attendance interest.

There is no more thorough way of guiding machine tool thought-trend than through such education, offered to large numbers of persons, as featured both the recent Cleveland and this West Coast exhibition.

• • •

Indiana, Michigan and New Jersey are reported by a prominent maker of production lathe equipments as top areas of activity during the past two weeks; orders were in lots of two to four machines. Pennsylvania is producing volume for a screw machine builder who also reports a well maintained order condition in New Jersey. New England has witnessed some keen competition on strictly production equipments on which, it is understood, orders have been divided between mid-western and eastern makers.

Equipment for steel and can making industries are said to be on the order calendar awaiting only final decisions as to how purchases shall be equitably apportioned.

### Manufacturing Locations

Progressive mid-western cities are said to be showing a considerable interest in the possibility of inducing eastern machine tool manufacturers to locate in that area. Past experiences in respect to such moves are proving to be a damper to present efforts. It is well recorded that eastern employees do not successfully transplant in flat territories.

### Cincinnati

Orders on large planer and boring mill contract work are reported from heavy machine tool plants. The extent to which delayed machine deliveries affect such orders is not entirely clear, but opinion is expressed that, while there is a heavy backlog in large equipment, some prospective new machine business is being held back, through contract device, for fall placing.

Review of the past week's orders reveals purchases in agricultural implement, airplane, and household equipment industries, with a widening source of orders, primarily in lots of one and two machine units. Inquiry continues brisk and opinion strengthens that there will be no slacking of maker activity during summer months.

### Metropolitan

Many distributors feel that the maintained volume of inquiries during May spells for a good volume of June business. While total May sales are not available at the moment, optimism as to final figures, compared with previous months of the year, is general. Small tools and improved units which can be attached to installed equipment are said to have reached top order totals during May.

### Cleveland

Local territory demand is said to have been light during the final week of May, with an equally light interest in used equipments. A builder of turret lathes reports the second best order month since 1929. An automatic screw machine spurt, reported on May 14, continued to be an interesting development up to the end of the month.

### Detroit

Inquiries are maintained at a high rate. With the present push for deliveries, billings will continue to be high for several months. General Motors, in particular, seems bent on putting all of its many plants in top-notch operating condition. Outside of Packard, the independents have exhibited only a slight rash as a symptom of modernization fever. A more definite breaking out is, however, very certain to follow. The machine tool industry is doing its part in presenting proposals to meet the condition when it develops. As stated last week, the surface of order possibilities has hardly been scratched.

### Philadelphia

Continued buying of single tools, in combination with both Army and Navy orders, is said to have carried May into totals probably exceeding those of any previous 1936 month. The figures cover a somewhat far-flung territory as a considerable portion of the Atlantic seaboard is listed as Philadelphia territory by some makers. Opinion prevails that Philadelphia will go right along buying single tools during the summer.

### Southern

Recent reports in this column on revived Southern interest in new tools are substantiated by further reports from widely scattered makers, some of whom, it seems, were beginning to despair of breaking in on used tool habits formed during the depression period. Present considerations concerning equipments to be purchased are said to be definitely toward new tools.

# PLANT EXPANSION AND EQUIPMENT BUYING



... Universal Atlas Cement Co., Chicago, has authorized fund of \$1,500,000 for plant expansion and improvements at Leeds, Ala., including quarry properties.

... American Can Co., New York, has let contract for an addition to branch plant at Jersey City. Cost over \$250,000 with equipment.

... Marine Dry Dock & Repair Corp., New York, recently organized, will expend \$250,000 for a dry dock and plant units on New Jersey side of Hudson River, near George Washington bridge.

## ◀ NORTH ATLANTIC ▶

American Can Co., 230 Park Avenue, New York, has let general contract to Turner Construction Co., 420 Lexington Avenue, for seven-story addition to branch plant at Jersey City, N. J. Cost over \$250,000 with equipment.

Nichols Copper Co., 40 Wall Street, New York, plans extensions and improvements in plant at 43-09 Fifty-fifth Drive, Long Island City, including new crane runway and other mechanical-handling facilities. Cost close to \$60,000 with equipment.

Peter Doelger Brewing Corp., 501 West 125th Street, New York, has leased former Peter Hauck Brewery, Harrison, N. J., with option to purchase within five years, and will remodel for new branch plant. Work will include new mechanical-bottling works with brewing and auxiliary equipment to double present capacity. Cost close to \$100,000 with machinery.

John Morrell & Co., 653 Brook Avenue, New York, meat packers, with headquarters at Ottumwa, Iowa, have plans for new four-story plant, 50 x 103 ft., at 446-48 West Fourteenth Street, New York. Cost about \$100,000 with equipment, including cold storage and refrigerating machinery. H. Peter Henschien, 59 East Van Buren Street, Chicago, is engineer.

International Cement Corp., 342 Madison Avenue, New York, plans extensions and improvements in branch mill at Nazareth, Pa., including additional equipment. Cost over \$75,000 with machinery.

Dejur Electric Works, 124 Bleeker Street, New York, manufacturer of electrical specialties, parts, etc., has purchased Factory B of International Silver Co. at Shelton, Conn., and will improve for new plant, with facilities for large capacity. Company has been formed to operate works, to be known as Dejur Corp. of Connecticut, Inc.

New York Central Railroad Co., 466 Lexington Avenue, New York, has begun su-

perstructure for one-story car shop with repair and reconditioning facilities in conjunction with new terminal station at Syracuse, N. Y., for which general contract recently was let to Gorsline & Swan Construction Co., 96 Pearl Street, Rochester, N. Y. Cost close to \$100,000 with equipment.

International Television Radio Corp., 96 Prince Street, New York, is arranging for sale of about \$1,600,000 capital stock, considerable part of proceeds to be used for expansion in plant and facilities, including machinery for general production and development of new apparatus.

Marine Dry Dock & Repair Corp., New York, has been organized by Harry J. Connors, president, Connors Marine Co., Inc., 21 West Street, and associates to build a tug and barge-building and repair works. New company has leased about 3000 ft. of waterfront property on New Jersey side of Hudson River, near George Washington bridge, and plans early construction of new floating drydock, shops and other plant units. Cost over \$250,000 with equipment. Harry E. Connors and Joseph F. Herrman will also be officials of new company.

Signal Property Officer, Signal Corps Laboratories, Fort Monmouth, Oceanport, N. J., asks bids until June 8 for 5 to 10 miles of wire (Circular 16).

Monroe Calculating Machine Co., 555 Mitchell Street, Orange, N. J., has approved plans for two-story addition; with foundations for two additional floors later. New unit will approximate 16,500 sq. ft. floor space and will be used for punch press department, doubling capacity of present division, which will be removed to new unit; vacated space will be used for enlargement of screw machine department, with installation of new equipment. Cost about \$150,000 with machinery. Company is also erecting one-story top addition to existing factory unit, totaling 5200 sq. ft. floor space, for expansion in plating and japping departments.

Commanding Officer, Ordnance Department, Picatinny Arsenal, Dover, N. J., asks bids until June 8 for 20 gross steel forgings for parachute attaching eye, 20 gross steel forgings for suspension lug and 2600 suspension links (Circular 400).

Republic Radio Mfg. Corp., 76 Coit Street, Irvington, N. J., has leased about 20,000 sq. ft. floor space in Building 39 of former plant of Clark Thread Co., East Newark, N. J., for new works, removing present plant to such location and increasing capacity.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until June 9 for one motor-driven power hammer (Schedule 8057), two 8-ft. hand-operated bending brakes (Schedule 8047), two switchboard generators and accessory equipment (Schedule 7994) for Philadelphia navy yard; two non-tilting type portable cement mixers (Schedule 8033) for White Plains, N. Y., station; until June 12, four fuel oil service pumps, two fuel oil booster pumps, two fuel oil transfer pumps, eight main lubricating oil service pumps and spare parts (Schedule 8018) for Brooklyn yard; aluminum alloy rough castings (Schedule 8032) for Philadelphia yard.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until June 8 for one super-sensitive, high-speed, motor-driven, bench-type, single-spindle drill press (Circular 501).

Harris Alloys, Inc., Newark, N. J., manufacturer of alloy wire, has taken additional space at 222 Verona Avenue for increased production of heavier gage alloy wire. Fred T. Harris is in charge of production.

## ◀ NEW ENGLAND ▶

Largay Brewing Co., 1090 Bank Street, Waterbury, Conn., has let general contract to T. G. Smith Co., 18 Orange Street, for addition. Cost over \$50,000 with equipment. Shattuck & Layer, 221 North La Salle Street, Chicago, are architects.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until June 15 for two selective geared-head manufacturing lathes (Circular 229), one single surface planer (Circular 233).

Risdon Mfg. Co., Naugatuck, Conn., manufacturer of formed metal and wire goods, has acquired plant and business of Smith & Griggs Mfg. Co., Waterbury, Conn., manufacturer of wire and brass specialties, drawn and stamped metal goods, etc., and will operate as a branch works.

Board of Selectmen, Ansonia, Conn., plans manual training department in new two-story high school, for which bids have been asked on general contract. Cost about \$300,000 with equipment.

Worcester Street Railway Co., 107 Main Street, Worcester, has plans for new one-story car shop for reconditioning and repairs, 100 x 125 ft. Cost over \$70,000 with equipment. Lewis E. Moore, 73 Tremont Street, Boston, is engineer.

United Aircraft Corp., East Hartford, has let general contract to R. G. Bent & Co., Hartford, for new one-story plant, 256 x 400 ft., adjoining works of Pratt & Whitney Aircraft Co., a unit of organization, to be occupied by Hamilton Standard Propeller Division. Space now occupied by latter company in Pratt & Whitney works will be used for increased aircraft engine production. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer. Cost over \$200,000 with equipment.

## ◀ OHIO AND INDIANA ▶

Vienna Brewing Co., Sycamore and Elizabethtown Streets, Cincinnati, will take bids at once on general contract for two-story and basement addition, 67 x 105 ft., primarily for a mechanical-bottling works. Cost about \$50,000 with equipment. Kruckemeyer & Strong, Carew Tower Building, are architects.

Ballonoff Metal Products Co., 6407 Woodland Avenue, S.E., Cleveland, manufacturer of sheet metal products, conduits, etc., has leased two-story building at 5815 Kinsman Road, S.E., about 20,000 sq. ft.



Every phase of material handling in the Mechanical Industries is covered pictorially in this 16-page folder. The photographs take you inside a wide variety of plants and show you how their managements are solving transportation problems connected with warehousing, storage, and shipping, machine-feeding, die-handling, and foundry operations, and are moving raw material, parts, and other loads in ways that save them money. In its pages you are almost certain to find some suggestion which will repay you liberally for the time you devote to reading it.

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floor space, for new plant with increased capacity.

**Lindsay Wire Weaving Co.**, 14025 Aspinwall Avenue, N.E., Cleveland, has let general contract to James C. Schafer Co., Smythe Building, for one-story addition. Cost about \$25,000 with equipment. Osborn Engineering Co., 7016 Euclid Avenue, is engineer.

**Contracting Officer, Material Division, Air Corps**, Wright Field, Dayton, Ohio, asks bids until June 8 for gage plugs, cylindrical and end types (Circular 884), two 30-hp. electric motors and two hand-starting compensators (Circular 877), 260 navigation compass assemblies and similar compass assemblies in lots of 100 to 400 (Circular 853); until June 9, 1709 drills and countersinks and 30 sets drill blanks (Circular 885); until June 10, 50 exhaust collector assemblies (Circular 887), 6000 tow target assemblies (Circular 888); until June 11, 1000 tube assemblies, airspeed type (Circular 849); until June 12, three electric-operated power punch presses (Circular 883).

**Servel, Inc.**, 119 North Morton Street, Evansville, Ind., manufacturer of gas-operated refrigerator units and parts, has let general contract to Hoffman Construction Co., Central Union Bank Building, for one-story addition, 158 x 200 ft. Cost close to \$100,000 with equipment.

**Hoosier Lamp & Stamping Co.**, Evansville, Ind., manufacturer of stamped metal goods, has acquired property at Edgar and Eichel Avenues, 100 x 255 ft., for new one-story plant, superstructure to begin soon. Cost close to \$50,000 with equipment.

## ◀ BUFFALO DISTRICT ▶

**Iroquois Beverage Corp.**, 230 Pratt Street, Buffalo, has plans for expansion and improvements in brewery, including new units and equipment for increase in present capacity. Cost over \$450,000 with machinery.

**Ludlum Steel Co.**, Dunkirk, N. Y., has let general contract to Gilmore-Carmichael-Olson Co., 1873 East Fifty-fifth Street, Cleveland, for one-story addition, primarily for steel wire goods division. Cost about \$65,000 with machinery. Main offices of company are at Watervliet, N. Y.

**Co-Operative G.F.L. Mills, Inc.**, Chamber of Commerce Building, Buffalo, has taken out permit for new grain elevator, storage and distributing building at 329 Ganson Street. Cost about \$150,000, including elevating, conveying, screening and other equipment. Otto F. Tantzer is vice-president.

## ◀ SOUTH CENTRAL ▶

**Universal Atlas Cement Co.**, 208 South La Salle Street, Chicago, has approved plans for expansion and improvements in mill at Leeds, Ala., near Birmingham, including new buildings for general production, packing plant unit, stock house, repair shop, laboratory and other structures. New motor-driven grinding and crushing machinery, blending equipment, etc., will be installed with new bins for storage and distribution, conveying and other mechanical-handling equipment. Company will also carry out expansion at local quarry properties, with installation of new electric-operated shovels and other equipment. Fund of \$1,500,000 has been authorized for entire project, which is scheduled for completion next spring. Company is a subsidiary of United States Steel Corp.

**United States Engineer Office**, Vicksburg, Miss., asks bids until June 11 for butterfly valve frames, four operating stands for butterfly valves, four shaft coupling flanges, four hand-wheels for butterfly operating gear, four sector and four worms (Circular 273); until June 16, one double-drum steam hoist without boiler (Circular 277).

**Hart Enterprise Electrical Co., Inc.**, Baronne Street, New Orleans, electrical equipment, parts, etc., plans rebuilding part of factory recently destroyed by fire. Loss close to \$100,000 with equipment.

**Old Lewis Hunter Distillery Co.**, Cynthiana, Ky., has plans for new one-story storage and distributing plant at Lair,

Ky. Cost about \$60,000 with equipment. J. C. Rankin is general manager.

**Director of Purchases, Tennessee Valley Authority**, Knoxville, Tenn., asks bids until June 8 for radial stacker and reclaiming conveyor for Guntersville Dam plant, Guntersville, Ala.

## ◀ WESTERN PA. DIST. ▶

**Pittsburgh Plate Glass Co.**, Grant Building, Pittsburgh, will begin work in July on three-story factory branch, storage and distributing plant, 85 x 160 ft., at Miami, Fla. Cost about \$125,000 with equipment.

**Newsome Feed & Grain Co.**, foot of Fifteenth Street, Pittsburgh, producer of special processed brans for oil-absorption service in tin plate manufacture and kindred special products, has acquired former plant of Hiner Steel Co., Louisville, Ohio, defunct, and will remodel for new branch mill. Cost over \$50,000 with equipment.

**American Nickeloid Co.**, Walnutport, Pa., manufacturer of nickel-zinc, nickel-brass, chrome-brass and kindred products, plans one-story addition. Cost over \$45,000 with equipment. Company headquarters are at Peru, Ill.

## ◀ SOUTH ATLANTIC ▶

**City Council**, Demorest, Ga., asks bids until June 9 for four pumping units with accessories, 50,000-gal. steel standpipe, 200,000-gal. filter unit, two chemical feed machines and other equipment for waterworks extensions. Robert & Co., Inc., Bona Allen Building, Atlanta, is consulting engineer.

**Chevrolet Motor Co.**, McDonald Boulevard, Atlanta, has let general contract to A. K. Adams Co., 542 Plum Street, N.W., for one-story addition to assembling works, 80 x 180 ft. Cost close to \$100,000 with equipment. Company headquarters are at Detroit.

**City Council**, Hemp, N. C., asks bids until June 9 for motor-driven pumping machinery and accessories, filtration plant, 200,000-gal. elevated steel tank and tower, and other equipment for municipal waterworks; also mechanical mixer, screening and chlorinating equipment, pumps, sludge equipment and accessories for sewerage treatment works. L. V. Edwards, Hemp, is engineer.

## ◀ WASHINGTON DIST. ▶

**Purchasing and Contracting Officer, Holabird Quartermaster Depot**, Baltimore, asks bids until June 12 for traction devices for motor trucks (Circular 162); until June 15, machine and hand tools, shop and garage equipment, totaling 440 items in all (Circular 154).

**Crosse & Blackwell Co.**, 6801 Eastern Avenue, Baltimore, manufacturer of food products, has asked bids on general contract for one-story addition. Cost close to \$50,000 with equipment. Lucius R. White, Jr., 10 West Chase Street, is architect.

**General Purchasing Officer, Panama Canal**, Washington, asks bids until June 9 for galvanized extension pipe hangers, galvanized wrought iron or steel pipe straps, black pipe fittings, railing fittings, galvanized cast iron unions, brass body angle valves, check valves, drills and other equipment (Schedule 3149).

**Bureau of Yards and Docks**, Navy Department, Washington, will soon take bids for new steel floating drydock at Pearl Harbor Naval Station, Hawaii, 1016 ft. long, 1165 ft. wide, and 75 ft. from top to keel, including operating mechanism, power station, machine shop facilities, traveling cranes, electric hoists and other equipment. Cost about \$10,000,000 with machinery. Appropriation has been authorized.

**Armour & Co.**, Union Stock Yards, Chicago, have let general contract to James Baird Co., Thirteenth and F Streets, Washington, for one-story addition to plant at 501 Twelfth Street, S.W., Washington. Cost close to \$60,000 with equipment. F. A. Linberg is company engineer.

**Bureau of Supplies and Accounts, Navy Department**, Washington, asks bids until

June 9 for separators and corrosion-resistant steel forgings (Schedule 8017) for Washington Navy Yard; one 5-ton self-propelled crane (Schedule 8005), one 800-lb. air-driven forging hammer, single frame (Schedule 8010), crucibles, without covers (Schedule 8013), steel wire nails (Schedule 7996); until June 12, about 63,000 lb. galvanized steel expanded metal (Schedule 8006) for Eastern and Western yards; 11,000 ft. electric cable (Schedule 8038) for Norfolk, Va., yard; until June 9, three motor-driven foot-type sensitive drilling machines (Schedule 8051) for Charleston, S. C., yard.

## ◀ SOUTHWEST ▶

**Alco Valve Co.**, 2628 Big Bend Boulevard, St. Louis, has plans for one-story addition. Cost about \$35,000 with equipment. C. R. Kohlmeier, 720 Pacific Avenue, Webster Groves, St. Louis, is architect.

**Monsanto Chemical Co.**, 1700 South Second Street, St. Louis, will begin immediate construction of new phosphate works near Columbia, Tenn., recently referred to in these columns, where a new townsite, to be known as Monsanto, Tenn., will be established. Plant will include one and multi-story units for crushing, grinding, refining and treating, with division for production of phosphoric acid. Equipment will be electric-operated, power to be furnished by Tennessee Valley Authority. Company will also develop phosphate lands in same district, lately acquired. Entire project will cost close to \$1,500,000 with equipment, instead of smaller sum, previously noted.

**Lion Oil Refining Co.**, Eldorado, Ark., has authorized expansion in asphalt and road oil refinery, including new still and auxiliary equipment. Cost about \$100,000 with equipment. Company has also leased about 2700 acres of additional oil lands in Jack, Jones and Young counties, Tex., and 900 acres in Ellis County, Kan., and plans early development for crude oil supply, including installation of drilling machinery, gathering pipe lines and storage facilities.

**Kranz Automotive Body Co.**, 3032 Gravois Street, St. Louis, has let general contract to George Moeller Construction Co., 3520 Itasca Street, for one-story addition, 25 x 125 ft. Cost over \$45,000 with equipment. Leonard Haeger, 3844 Utah Place, is architect.

**Common Council**, Lockhart, Tex., plans new municipal electric power plant and electrical distributing system. Cost close to \$100,000 with equipment. Burns & McDonnell Engineering Co., 107 West Lincoln Boulevard, Kansas City, Mo., is consulting engineer.

**McAllen Citrus Association**, McAllen, Tex., has let contract to Mosher Steel & Machinery Co., Houston, Tex., for one-story citrus fruit packing plant. Cost about \$40,000 with conveying, loading, air-conditioning and other equipment.

## ◀ MICHIGAN DISTRICT ▶

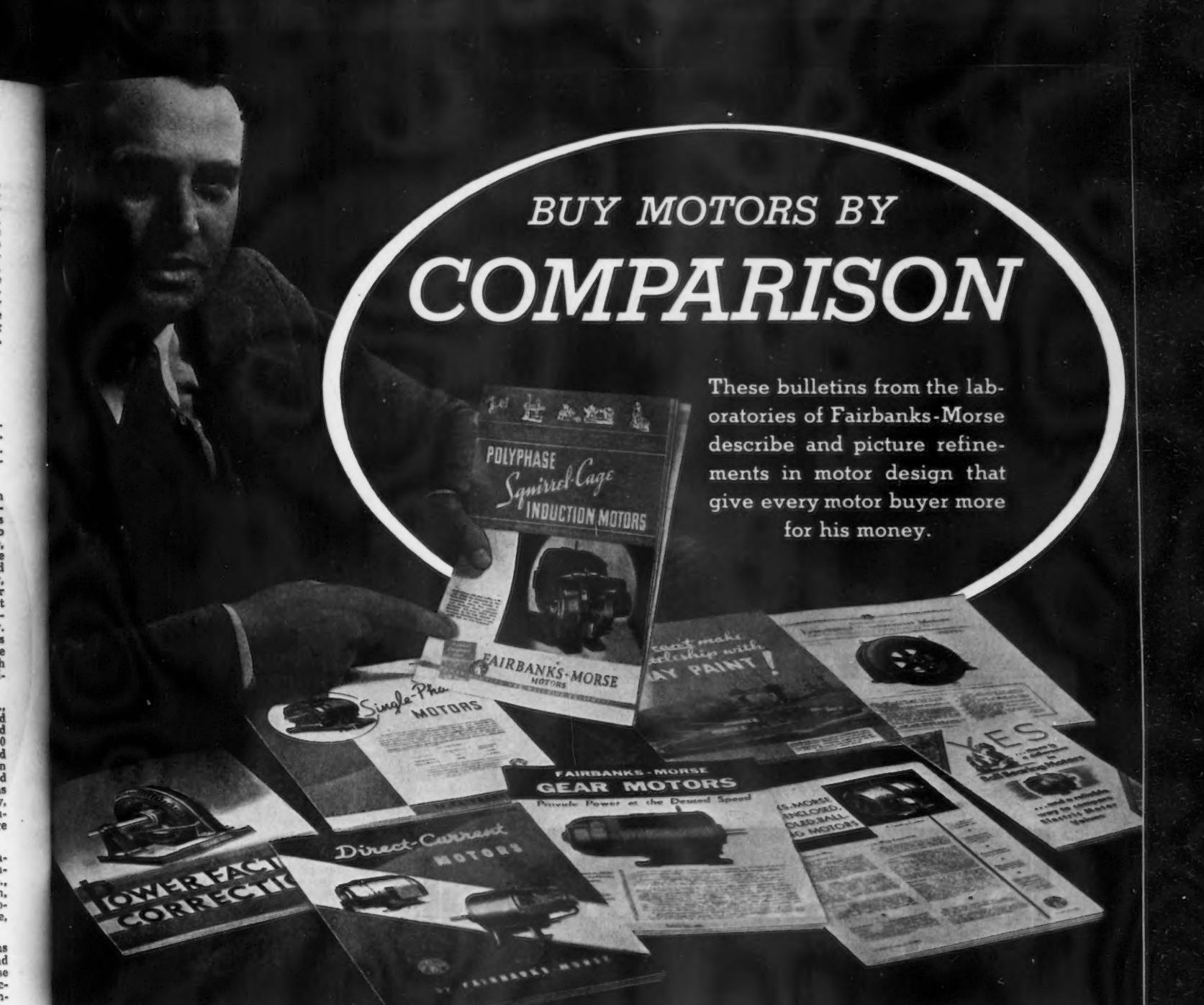
**Craine-Schrage Steel Co.**, 6189 Hamilton Street, Detroit, steel products, has let general contract to Barton-Malow Co., 1900 East Jefferson Street, for one-story storage and distributing plant, 160 x 270 ft. Cost over \$60,000 with mechanical-handling and other equipment. C. Howard Crane, Inc., 112 Madison Street, is architect.

**Bay City Mfg. Co.**, Bay City, Mich., has been organized as a subsidiary of Electric Auto-Lite Co., Toledo, Ohio, and will take over former plant of Wildman Rubber Co., at first noted place, recently acquired by parent company. Structure will be remodeled for production of a new rolled metal automotive specialty, parts, etc. Cost about \$125,000 with machinery.

**Bay City Brewing Co.**, Bay City, Mich., has let general contract to H. C. Weber Construction Co., Bay City, for two-story and basement addition, 50 x 65 ft. Cost close to \$50,000 with equipment.

**Art Metal Works**, 3795 Fourteenth Street, Detroit, has leased building at 6188-90 Twelfth Street for new plant, expanding present capacity.

**Grand Haven Stamped Products Co.**, Grand Haven, Mich., has begun erection of



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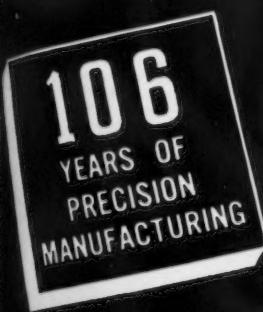
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# FAIRBANKS - MORSE

## Motors



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one-story addition. Cost close to \$30,000 with equipment.

**Climax Molybdenum Co. of Michigan, Inc.**, 15 East Bethune Street, Detroit, has plans for new one-story plant, 60 x 200 ft., to include laboratory unit. Cost over \$75,000 with equipment. Clair W. Ditchy, Fisher Building, is architect. Company is affiliated with Climax Molybdenum Co., 500 Fifth Avenue, New York.

## ◀ MIDDLE WEST ▶

**Dole Valve Co.**, 1923 West Carroll Street, Chicago, has asked new bids on revised plans for three-story and basement addition, 70 x 130 ft., and improvements in present factory. Cost about \$90,000 with equipment. Ivar Viehe-Naess, 5809 Ridge Street, is architect.

**United States Engineer Office**, Clock Tower Building, Rock Island, Ill., asks bids until June 24 for electric power control equipment for lock and dam No. 11, Mississippi River, near Dubuque, Iowa, including lock power and control system, dam power electrical distributing system, lock and dam lighting system, navigation signal and lighting system, gas-electric standby power unit, electric-operated tow-haulage equipment, hand-operated traveling bridge crane, fuel oil supply system and other equipment.

**Peoria Distillers, Inc.**, Peoria, Ill., operating at former distillery of Hiram Walker & Sons, Inc., has approved plans for expansion, including new drying, evaporating and other equipment, with erection of new unit for storage and distribution. Cost close to \$100,000 with equipment. Company has arranged financing in amount of \$437,100, part of fund to be used for purpose noted. Clinton S. Robison & Associates, 333 North Michigan Avenue, Chicago, are engineers.

**E. F. Johnson Co.**, Waseca, Minn., manufacturer of radio transmitting equipment, parts, etc., has asked bids on general contract for new two-story plant unit, 50 x 120 ft. Cost about \$35,000 with equipment.

**Common Council**, New Market, Iowa, asks bids until June 18 for municipal electric power plant, including Diesel engine-generating units, fuel oil storage system and accessory equipment for municipal electric power plant; also distribution system. A. S. Harrington, Baum Building, Omaha, Neb., is consulting engineer.

**Cudahy Packing Co.**, 221 North La Salle Street, Chicago, meat packer, will soon take bids on general contract for one-story addition to branch plant at Newport, Minn. Cost over \$50,000 with equipment.

**Fisher Body Corp.**, Detroit, has plans for an addition, 120 x 640 ft., one-story to branch factory at Janesville, Wis., serving Janesville assembly plant of Chevrolet Motor Co. Unloading equipment will be installed.

**Kimberly-Clark Corp.**, Neenah, Wis., has placed general contract with James Leck Construction Co., Minneapolis, for addition, 110 x 130 ft., five stories and basement, to Lake View mill. With equipment, investment will be upward of \$250,000.

**D. D. Weschler & Sons Co.**, 4295 West Burnham Street, Milwaukee, is taking bids for malt house addition, 100 x 130 ft., costing \$200,000, and grain elevator addition, 50 x 60 ft., 100 ft. high, to cost \$75,000. George L. Lehle is construction engineer.

**General Malleable Corp.**, Waukesha, Wis., has acquired Claffey Casting Co., gray iron founder, and Werra Aluminum Co., and has established malleable, gray iron and non-ferrous castings divisions under general management of L. D. Harkrider, president of purchasing company. An expansion program is under way, and capacity of Claffey division will be substantially increased by transfer to space in Werra plant. Bernard M. Claffey will continue in charge of this division which specializes in production of small cylinder blocks and other automotive castings. Until now it has occupied space in General Malleable Plant. Werra company, which was founded by Conrad Werra, son of founder and who is former receiver, will direct aluminum division. While purchase prices have not been revealed, it is stated that consolidated concerns have a going value of \$750,000 and together provide employment for 500 workers, which will be increased as business expansion requires.

## ◀ PACIFIC COAST ▶

**Friden Calculating Machine Co.**, Washington Avenue, San Leandro, Cal., has let general contract to Fred K. DuPuy, 110 Sutter Street, San Francisco, for new one-story plant, 72 x 262 ft. Cost about \$75,000 with equipment. Fred H. Reimers, 233 Post Street, San Francisco, is architect.

**San Diego Consolidated Gas & Electric Co.**, San Diego, Cal., has authorized appropriation of \$930,000 for expansion and improvements this year, including power plants, power substations, transmission and distributing lines, and miscellaneous structures.

**Bureau of Reclamation**, Denver, asks bids until June 11 for one steel tower supporting structure and three pedestal supporting structures for lightning arresters, one steel supporting structure for transfer disconnecting switches and one steel supporting structure for single disconnecting switches, one steel bus structure and three steel lightning arrester pedestals for Boulder power plant, Boulder Canyon project (Specifications 798-D); also until June 15, for five 30-in. sphere valves for station service penstock, same project (Schedule 687).

**Three G Distillery**, 3112 West San Fernando Road, Burbank, Cal., has asked bids on general contract for addition with main tower unit for distillery, roller mill department, cookers, bins, etc. Cost close to \$200,000 with equipment. Plans are under way for other buildings, including new fermenting unit and steam power house, for which bids will be asked soon. Arlos R. Sedgley, 910 North Serrano Avenue, Los Angeles, is architect.

**Paraffine Companies, Inc.**, Emeryville, Cal., manufacturer of building papers and other heavy processed paper stocks, plans extensions and improvements in mill, including additional equipment. Fund of about \$250,000 has been authorized, to be secured from proceeds of sale of preferred and common stock now under way. R. S. Shainwald is president and general manager.

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until June 9 for flameproof cable, lighting and power cable, and 220,000 ft. portable cable for Mare Island, Puget Sound and Brooklyn navy yards (Schedule 8004); until June 16, one motor-driven hacksaw for San Diego yard (Schedule 8052), two electrically heated combination sterilizers for Mare Island yard (Schedule 8061), 18 transformers and accessories for San Pedro, Los Angeles, Naval Station (Schedule 8053).

## ◀ FOREIGN ▶

**Ferranti, Ltd.**, Hollinwood, near Oldham, Lancashire, England, manufacturer of electric equipment, parts, etc., has acquired former station property of Oldham Corp. Tramway System, and will remodel for addition, with facilities for employment of about 200 additional operatives. Cost about \$125,000 with equipment.

**General Motors-Holden's, Ltd.**, Brisbane, Queensland, Australia, manufacturer of Chevrolet, Buick, Oldsmobile, Cadillac and other cars, with five assembling plants and two body manufacturing works, plans expansion and improvements in different plants, including new equipment. Entire program will be carried out this year and will cost about \$2,500,000. Assembling works are at Brisbane, Melbourne, Sydney, Adelaide and Perth, with main body plant at Woodville. It is affiliated with General Motors Corp., Detroit. J. R. McKenzie, Brisbane works, is acting managing director.

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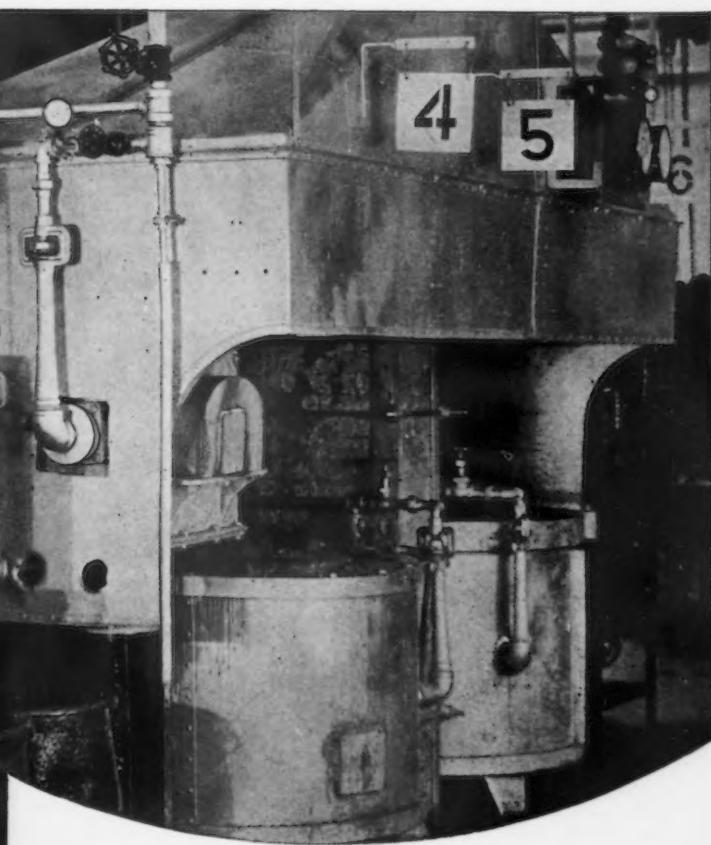
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## TRADE NOTES

**M. P. Iding Disc Grinding Compound Co., Inc.**, has moved main office and factory to 3534 West Pierce Street, Milwaukee.

**Sterling Grinding Wheel Co.**, Tiffin, Ohio, will open branch office and warehouse at 912 West Washington Boulevard, Chicago.

**Pennsylvania Pump & Compressor Co.**, Easton, Pa., has appointed Lieb-Jackson, Inc., 337 South High Street, Columbus, Ohio, representative in the Columbus district, and F. B. Schwartz, 1019 Washington Avenue, South, Minneapolis, representative in Minnesota and western Wisconsin.

**Schulte Grinding & Polishing Machine Co.**, has moved offices to 3300 Riverside Avenue, S.W., Cleveland.

**Charles Taylor Sons Co.**, Cincinnati, has moved eastern district office to Hudson Terminal Building, 30 Church Street, New York. Ripley Quinby is district manager.

**Macwhyte Co.**, Kenosha, Wis., has opened new branch and warehouse building at 1603 N. W. Fourteenth Avenue, Portland, Ore. W. J. Brett, factory representative in Northwest will have headquarters there.

**James Gay**, West Coast representative of the Toledo Steel Products Co., Toledo, has moved his headquarters from Los Angeles to 528 Larkin Street, San Francisco. He is assisted by Gardner Smith, who covers Southern California and Arizona.

**Petrie Tractor & Equipment Co.**, Billings, Butte, and Great Falls, Mont., has been appointed distributor for Link-Belt crawlers, shovels, draglines and cranes, in Montana.

**James T. Gordon Co.**, has moved New York office to Woolworth Building, where Andale Co., American Flexible Coupling Co., Cleveland Worm & Gear Co. and Farval Corp. are represented.

**Munning & Munning, Inc.**, has moved office to 11 West Forty-second Street, New York.

**Hendrick Mfg. Co.**, 30 Church Street, New York, is handling sale of Mitco interlocked steel grating, Shur-Site treads and Armogrids. B. G. Dann is manager, and Richard W. Tull will specialize in Mitco products.

**Rail Joint Co.**, has moved its New York office to 50 Church Street.

**Major Engineering Works** has moved its offices to 312 Second Street, Des Moines, Iowa, where a complete stock of Lincoln Electric Co. welders and accessories will be carried.

**Fletcher, Terry Co.**, has moved Chicago office to 30 North LaSalle Street.

**New Departure Mfg. Co.**, has moved Chicago office to 230 North Michigan Avenue.

**Falk Mill Supply Co., Inc.**, Rochester, N. Y., has moved office, display room and shop to 18 Ward Street, Rochester.

**American Steel Foundries**, Chicago, have moved New York office to New York Central Building, 230 Park Avenue, New York.

**Republic Steel Corp.** has opened district sales office in State Bank Building, Albany. J. M. Higinbotham is salesman in charge.

**Chicago Pneumatic Tool Co.**, New York, will open June 1 a new sales and service branch at 2415 Commerce Street, Dallas, Texas. D. G. Reeder will be district manager. The company's Pittsburgh office will be located 810 Chamber of Commerce Building.

**Republic Steel Corp.**, Cleveland, has appointed Cameron & Barkley Co., Jacksonville and Miami, Fla., and Jensen-Byrd Co., Spokane, Wash., as distributor. The latter will distribute Enduro stainless steel.

**Toledo Steel Products Co.** has moved Detroit warehouse to 443 East Fort Street.

**Pope Trading Corp.** has moved to 75 West Street, New York.

**Toledo Steel Products Co.** has established warehouse at 3150 Locust Boulevard, St. Louis.

## FINANCIAL NOTES

**Mesta Machine Co.**, Pittsburgh, has declared a quarterly dividend of 75c. a share on the common stock, placing the issue on a \$3 annual basis, against \$2 previously. The dividend is payable July 2 to stock of record June 16.

**International Nickel Co. of Canada, Ltd.**, had net profit in the first quarter of \$8,386,787, equal to 54c. a share on the common stock after provision for preferred dividends. This compares with net profit of \$4,917,627, equivalent to 30c. a share, for the corresponding quarter of 1935, and with \$8,005,700, or 51c. a share, for the final quarter last year.

**Spang, Chalfant & Co.**, Pittsburgh, and subsidiary, report for the quarter ended March 31, 1936, net income of \$313,522, after all charges, equal to \$2.41 on each share of outstanding preferred stock. This compares with a net income of \$131,903, or \$1.01 on the outstanding stock, in the first quarter of 1935.

**Sharon Steel Corp.**, Sharon, Pa., had consolidated net profit in the first quarter of \$212,616 after all deductions.

**St. Joseph Lead Co.**, New York, has declared a dividend of 20c. payable June 20 on stock of record June 9. A dividend of 10c. was paid on March 20.

## Sheet and Strip Output Makes Net Record

**Sheet and strip steel production** during 1935 was the highest in the history of the steel industry, according to the American Iron and Steel Institute.

Combined output of these products last year was 7,823,146 gross tons, 45 per cent higher than 1934 production, and above the previous record sheet and strip output of 7,757,791 gross tons in 1929. Sheet steel production last year amounted to 5,175,557 gross tons, and 2,647,589 gross tons of strip were produced.

The high production record reflected greatly expanded sales of automobiles, refrigerators, washing machines, farm equipment and other products in which sheet and strip are used.

In the ten-year period 1926-1935 the ratio of sheet and strip production to the total output of finished steel has more than doubled, the ratio being 32.6 per cent in 1935 compared with only 15.4 per cent in 1926.

Almost 80 per cent of the sheet and strip steel which can be traced to ultimate destination goes into products bought by individual consumers.

More than 60 per cent of the combined sheet and strip output is estimated to go into automobiles, while 4.5 per cent is used in furniture and office equipment.

Farmers consume nearly 4 per cent of the sheet and strip production in the form of farm implements and roofing and siding for farm buildings.

Household appliances, including refrigerators, washing and ironing machines, kitchen cabinets and utensils, account for more than 9 per cent of the output.

Only a little more than 20 per cent of the production of sheet and strip steel goes into products which are not bought directly by individuals for their own use. This part of the total output goes to railroads, public utilities, ship and barge builders, machinery manufacturers, and the like.

**Union Switch & Signal Co.**, Swissvale, Pa., subsidiary of Westinghouse Air Brake Co., has been awarded a contract to furnish and install block signals and interlocking equipment for the New York Independent Subway Line "E," from Fulton to Nassau Streets, Brooklyn.